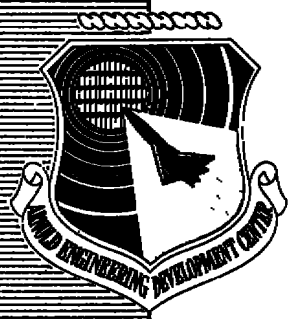
AEDC-TR-75-75
Volume I

cy.8



THE AEDC THREE-DIMENSIONAL, POTENTIAL FLOW COMPUTER PROGRAM

VOLUME I. METHOD AND COMPUTER PROGRAM

PROPULSION WIND TUNNEL FACILITY
ARNOLD ENGINEERING DEVELOPMENT CENTER
AIR FORCE SYSTEMS COMMAND
ARNOLD AIR FORCE STATION, TENNESSEE 37389

February 1976

Final Report for Period November 1971 — November 1974

Prepared for

DIRECTORATE OF TECHNOLOGY
ARNOLD ENGINEERING DEVELOPMENT CENTER
ARNOLD AIR FORCE STATION, TENNESSEE 37389

NOTICES

When U. S. Government drawings specifications, or other data are used for any purpose other than a definitely related Government procurement operation, the Government thereby incurs no responsibility nor any obligation whatsoever, and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise, or in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Qualified users may obtain copies of this report from the Defense Documentation Center.

References to named commercial products in this report are not to be considered in any sense as an endorsement of the product by the United States Air Force or the Government.

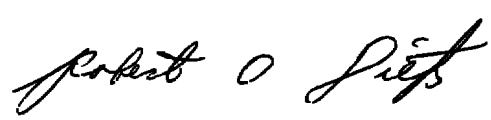
This report has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

APPROVAL STATEMENT

This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER

CARLOS TIRRES
Captain, USAF
Research & Development
Division
Directorate of Technology



ROBERT O. DIETZ
Director of Technology

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1 REPORT NUMBER AEDC-TR-75-75 Volume I	2 GOVT ACCESSION NO.	3 RECIPIENT'S CATALOG NUMBER
4 TITLE (and Subtitle) THE AEDC THREE-DIMENSIONAL, POTENTIAL FLOW COMPUTER PROGRAM VOLUME I. METHOD AND COMPUTER PROGRAM		5 TYPE OF REPORT & PERIOD COVERED Final Report - November 1971 - November 1974 6. PERFORMING ORG. REPORT NUMBER
7 AUTHOR(s) Donald C. Todd - ARO, Inc.		8. CONTRACT OR GRANT NUMBER(s)
9 PERFORMING ORGANIZATION NAME AND ADDRESS Arnold Engineering Development Center (DY) Air Force Systems Command Arnold Air Force Station, Tennessee 37389		10 PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS Program Element 65807F
11. CONTROLLING OFFICE NAME AND ADDRESS Arnold Engineering Development Center (DYFS) Air Force Systems Command Arnold Air Force Station, Tennessee 37389		12. REPORT DATE February 1976 13. NUMBER OF PAGES 108
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15 SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17 DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18 SUPPLEMENTARY NOTES

Available in DDC

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

three-dimensional flow	computer program	modeling techniques
flow fields	computer analysis	potential flow
subsonic flow	methematical models	vortex lattice

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A complete description of a computer analysis of the potential subsonic flow about complex three-dimensional bodies is presented. The linear, partial differential equation for the compressible velocity gradient is solved for cases where the local Mach number everywhere in the flow field is less than one. The compressible flow equation is transformed, using Goethert similarity parameter, into the equivalent incompressible form represented by Laplace's

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

20. ABSTRACT (Continued)

equation. The solution to the equation is accomplished by representing the body (or model) by a finite number of elements (or singularities). The singularities may be made up of either vortices or sources. The two volumes included in the report give the description of the computer program which is entitled the AEDC Potential Flow Program (PFP) and the computer analysis of several complex bodies. Volume I includes a theoretical development of the equations that lead to the set that are programmed in the PFP. A complete description of the computer program is given along with sample input and output from the program. Volume II includes a discussion concerning the modeling techniques that can be used to represent a wide class of three-dimensional bodies and gives the results of the flow field computed about these bodies using the PFP. Comparisons of some of the theoretical results are made with wind tunnel experimental data.

AFSC
Arnold AFS Tenn

PREFACE

The work reported herein was conducted by the Arnold Engineering Development Center (AEDC), Air Force Systems Command (AFSC), under Program Element 65807F. The technical monitoring of the effort was performed by Capt. Carlos Tirres, USAF, Research and Development Division, Directorate of Technology. The results presented were obtained by ARO, Inc. (a subsidiary of Sverdrup & Parcel and Associates, Inc.), contract operator of AEDC, AFSC, Arnold Air Force Station, Tennessee. The majority of the development and information presented was obtained under ARO Project Nos. PW5146, PW5246, PF218, and PF418. The author of this report is Donald C. Todd, ARO, Inc. The report was written under ARO Project No. P33A-36A. The manuscript (ARO Control No. ARO-PWT-TR-75-7, Volume I) was submitted for publication on March 3, 1975.

Acknowledgment is made of the contributions of Messrs. C. R. Fitch, W. C. Armstrong, K. R. Kneile, and E. W. Dorrell, Jr., in early development in the computer program and F. L. Heltsley and R. L. Parker, Jr., in modeling techniques.

CONTENTS

ILLUSTRATIONS

APPENDIXES

1.0 INTRODUCTION

In January 1971, a research effort was undertaken in the Propulsion Wind Tunnel Facility (PWT) at the Arnold Engineering Development Center (AEDC) to develop a new test technique for testing full-scale inlet/engine systems at high angles of attack and yaw. The steps taken in developing the new techniques were: (1) to determine for a given aircraft configuration the flow field at the inlet, (2) to develop flow shaping devices which are capable of producing the desired flow, and (3) to verify the ability of the device by conducting flow survey tests in the wind tunnel. The success of such an approach obviously depends on the ability to correctly determine the flow field produced by the aircraft and the flow shaping devices. To correctly determine these flow fields required either experimental data from wind tunnel tests or predictions made by analytical procedures. Wind tunnel testing was considered to be both too costly and time consuming because a large number of models would need to be fabricated and tested before the correct flow simulations were obtained. Therefore, it was determined that an analytical method of predicting the flow fields for both the aircraft and the flow shaping devices was needed.

At that time, a three-dimensional potential flow program which used a vortex-lattice to describe the model was in use at AEDC for flow field calculations. A compressibility correction using Goethert's Rule had been incorporated into the program for use at high subsonic Mach numbers. However, this program was fixed to use only 99 horseshoe vortices which restricted its use to very simple models. Since models with considerable detail would be required for the pending flow field analyses, the program was rewritten and expanded to allow the flow field about large models to be analyzed. The flow field calculations made with this program gave excellent agreement with wind tunnel data which ultimately resulted in the development of the testing technique desired. However, the program proved to be extremely slow. Whereas the solution for a model with 99 vortices could be obtained in approximately 30 min, the solution for a model with 570 vortices (the largest tried with this version of the program) took approximately 20 hr. This was considerably less time than required for fabrication and testing of a model; however, the time factor obviously restricted the use of the program. Therefore, a complete rewrite of the potential flow solution was undertaken which resulted in the present Potential Flow Program (PFP). With this program, the solution for a model with 1579 vortices was obtained in 16 hr on the old AEDC IBM-370-155 which should reduce to approximately 4 hr on the present AEDC IBM-370-165.

This volume presents the method of solution, describes the input and output, and provides other information necessary to run PFP. Also documented is a plot program which will plot various views of the model and flow field parameters. A sample run is given, including a complete listing of the run deck, the printed output, and plots.

2.0 METHOD

If flow is irrotational, then the velocity field is derivable from a potential. In particular, if the fluid is incompressible, then the potential satisfies Laplace's equation. The method used by PFP is to induce the flow by N singularities which are known to produce velocities which are derivable from a potential which satisfies Laplace's equation. Boundary conditions are imposed at N distinct points, called control points. This produces a linear set of N algebraic equations in N unknowns, which are the strengths of the singularities. When the strengths have been computed, the velocities anywhere in the field can be computed. The method is extended to compressible flow by using Goethert's compressibility correction.

The method used by PFP is outlined above and detailed in the following sections. The modeling data, i.e., the shape and locations of the singularities and the locations of the control points, are input to PFP. How to best model a particular flow problem has been learned by experience and is covered in Volume II.

2.1 SINGULARITIES

Helmholz's theorem states, if the divergence and vorticity of a vector field is known everywhere in space, then the field is completely specified. Thus, one can picture flow as being induced by its divergence and vorticity. To simplify manners, if one discretizes the divergence, the mathematical ideal, the point source is derived. Similarly, if vorticity is confined to lines, the mathematical concept of a line vortex is formed. These are the singularities used by PFP and are illustrated in Fig. 1.

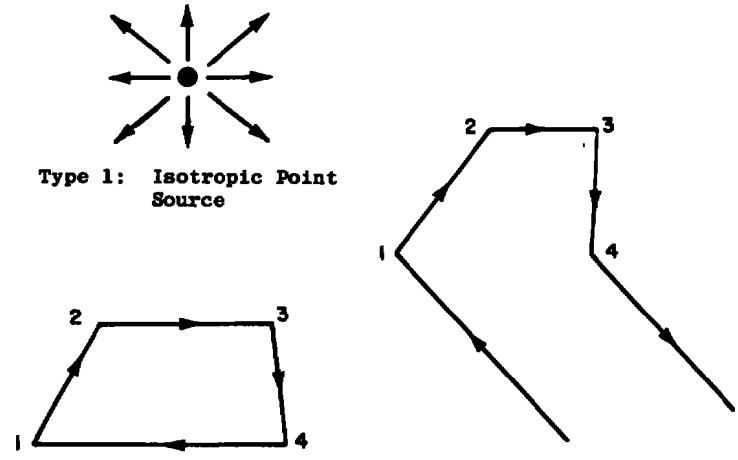
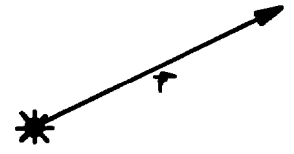


Figure 1. Types of singularities used by PFP.

Type 1 singularity is an isotropic point source or, in the case of negative strength, a point sink. The velocity induced by a point source is given by the equation in Fig. 2 where γ is the strength of the source and $\hat{r}$ is a unit vector in the direction of $\vec{r}$.

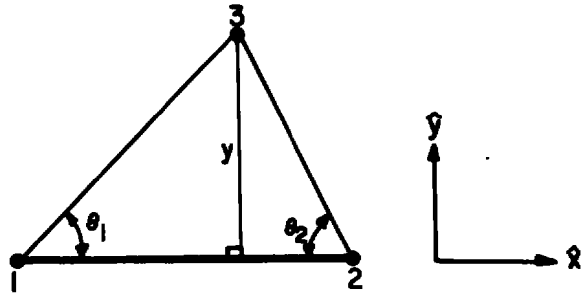


$$\vec{v}(\vec{r}) = \frac{\gamma \hat{r}}{4\pi r^2}$$

Figure 2. Velocity induced by an isotropic point source.

Since by a vector identity, the divergence of the vorticity is zero, it can be proved that a line vortex must either be a loop or else must come from infinity and return to infinity. For ease of reference, the term "shoe" was coined to refer to the latter case. As shown in Fig. 1, PFP restricts a line vortex to either a quadrilateral or a three-sided shoe. The trails of Type 3 singularities are all parallel, the direction being input to PFP. In Fig. 1, the numbers beside the vortices of Types 2 and 3 indicate the order they are input to PFP.

The velocities induced by Types 2 and 3 singularities are formed by adding the velocities induced by the sides and trails. The velocity induced by a vortex line segment is given by the equation in Fig. 3. The vortex is between Points 1 and 2, and the velocity is at Point 3. The unit vectors $\hat{x}$ and $\hat{y}$ are in the plane of the 3 points. The angles (θ_1 and θ_2) are defined by the figure. the strength of the vortex is γ, and y is the distance between Point 3 and the line determined by Points 1 and 2. The velocity induced by a vortex ray or trail is found as a limiting case as one of the angles (θ_1 or θ_2) approaches zero.



$$\vec{v} = \frac{\gamma}{4\pi y}(\cos\theta_1 + \cos\theta_2)(\hat{x} \times \hat{y})$$

Figure 3. Velocity induced by a vortex line segment.

2.2 SYSTEM OF EQUATIONS

The velocity at any point is given by

$$\vec{v} = \vec{v}_\infty + \sum_{j=1}^{N} \gamma_j \vec{u}_j \tag{1}$$

In particular, the velocity at the i^{th} control point is given by

$$\vec{v}_i = \vec{v}_\infty + \sum_{j=1}^{N} \gamma_j \vec{u}_{ij}$$

The boundary condition at the i^{th} control point is that the flow must be perpendicular to the unit normal vector ($\hat{b}_i$) and thus the dot product

$$\vec{v}_i \cdot \hat{b}_i = \vec{v}_\infty \cdot \hat{b}_i + \sum_{j=1}^{N} \gamma_j \cdot \vec{u}_{ij} \cdot \hat{b}_i = 0$$

Rearranging, one obtains the system of linear algebraic equations satisfying the B.C.'s at the control points:

$$\sum_{j=1}^{N} (\vec{u}_{ij} \cdot \hat{b}_i)\gamma_j = -\vec{v}_\infty \cdot \hat{b}_i, \; i = 1, 2, \ldots, N$$

which can be solved for the strengths (γ_j). Once the strengths are known, the velocity can be computed at any point by Eq. (1).

2.3 GOETHERT'S RULE

Thus far the analysis applies only to incompressible flow. With certain approximations, compressibility can be accounted for by a transformation called Goethert's Rule[1]. The transformation is from the physical plane to a stretched plane in which the transformed velocity potential satisfies Laplace's equation, and thus, in which the method of solution used in the PFP is valid.

The transformation is made properly by PFP independent of the direction of $\vec{v}_\infty$; however, for convenience, assume that the free stream is in the x-direction. First, define

$$\beta \doteq \sqrt{1 - M_\infty^2}$$

[1]See Shapiro, Ascher R. The Dynamics and Thermodynamics of Compressible Fluid Flow. The Ronald Press Co., New York, 1953. Starting on page 394 of Vol. 1.

then the transformation from the physical plane to the stretched plane is given by

$$\bar{x} = x/\beta$$

$$\bar{y} = y$$

$$\bar{z} = z$$

$$\bar{v}_\infty = v_\infty$$

Velocities are computed in the stretched plane; then the velocities in the physical plane are given by

$$u = (\bar{u} - \bar{v}_\infty)/\beta^2 + v_\infty$$

$$v = \bar{v}/\beta$$

$$w = \bar{w}/\beta$$

For the limits of applicability of Goethert's Rule, see the reference cited in the footnote.

3.0 POTENTIAL FLOW PROGRAM

This section provides the concise, but detailed, information needed for the operation of PFP.

3.1 DATA SETS FOR PFP

Data sets used by PFP are listed below:

Data Set	Description
5	Card input data
6	Printed data
11	Model input data
12	Velocity input data
22	Velocity output data
90	System of equations
91, 92	Used in the process of solution of the system of equations; enough space should be allocated to Data Sets 91 and 92 to record the system of equations

3.2 CARD INPUT DATA FOR PFP

Four cards are read by PFP as follows:

Card	Variables	Format
1	LABEL	(18A4)
2	AX, AY, AZ, PROX	(4E10.0)
3	FX, FY, FZ, FS, EM, CAY	(6E10.0)
4	LX, LY, LZ, NW	(415)

The variables are as follows:

Variable	Definition
LABEL	Title of the shot
AX, AY, AZ	Angles in degrees the trails of Type 3 singularities make with the three axes
PROX	Proximity of a singularity or part thereof in which its effect is set equal to zero
FX, FY, FZ	Angles in degrees the free stream makes with the three axes
FS	Magnitude of the free-stream velocity
EM	Free-stream Mach number
CAY	Ratio of specific heats (Set to 1.4 if left blank)
LX, LY, LZ	Indicates symmetry with respect to respective planes (see below) 0 - no symmetry 1 - symmetry
NW	Left blank if the model input data are to be printed or if the number of singularities is not known; otherwise, it is the number of singularities

Symmetry can be specified with respect to any combination of the three zero planes ($x = 0$, $y = 0$, and $z = 0$) as indicated by the variables (LX, LY, and LZ). If there

is symmetry with respect to one plane, then one-half of the model is input. If there is symmetry with respect to two planes, then one-fourth of the model is input, and if with respect to three planes, then one-eighth of the model is input. Symmetry is easily imposed by combining each input singularity with all its reflections; all parts have the same strength.

3.3 MODEL INPUT DATA FOR PFP

Model data are input to PFP by a data set which is created by a separate program as is explained in Section 5. Each record of the data set supplies data for one singularity of the model and is read by the FORTRAN statement

```
READ (11)  X1,Y1,Z1,X2,Y2,Z2,X3,Y3,Z3,X4,Y4,Z4,
           CX,CY,CZ,BX,BY,BZ,L
```

The variable (L) indicates the type of singularity (1, 2, or 3) (see Fig. 1) or else the last record of the data set by a value of -999.

When L = 1, the coordinates of the point source are given in X1, Y1, and Z1.

When L = 2 or 3, the variables X1 through Z4 are the coordinates of the four vertices of the loop or shoe in the order indicated in Fig. 1.

The variables CX, CY, and CZ are the coordinates of the control point.

If CX = 1.E50, then the coordinates are computed by the FORTRAN assignments:

```
CX = .25* (X1 + X2 + X3 + X4)

CY = .25* (Y1 + Y2 + Y3 + Y4)

CZ = .25* (Z1 + Z2 + Z3 + Z4)
```

The variables BX, BY, and BZ are the components of the unit normal vector.

If BX = 1.E50, then the unit normal vector is computed by taking the normalized vector cross product of the two diagonals of the quadrilateral determined by X1 through Z4.

If BX = 1.E51, then the strength of the singularity is specified by BY.

3.4 VELOCITY INPUT DATA

Velocity input data are instructions to PFP as to what points in the flow field velocities and streamlines are to be computed. As explained in Section 5, this input is by a data set which is created by a separate program. Each record supplies either where a velocity is to be computed or where computation of a streamline is to begin. A record is read by a FORTRAN statement:

```
READ (12)  X,Y,Z,DS,A1,A2,X1,X2,Y1,Y2,Z1,Z2,
           FN,D,D,D,D,D,L
```

The variable (D) is not used.

The variable (L) indicates whether a velocity (L = 1) or a streamline (L = 2) is to be computed; or else a value of L = -999 indicates the last record of the data set.

If L = 1, then X, Y, and Z are the coordinates of where the velocity is to be computed. The rest of the data are not used.

If L = 2, then X, Y, and Z are where a streamline is to begin. The rest of the data provide control over the accuracy and length of the streamline as follows.

The initial step size is given by DS. The streamline is computed downstream if DS is positive and upstream if DS is negative. The maximum step size is the absolute value of DS.

The variables (A1 and A2) are angles in degrees. If the angle between velocities at the beginning and at the end of a step is less than A1, then the step size is increased. If the angle is greater than A2, then the step size is decreased. If $A2 \leqslant A1$, then they are set at the default values of 1 deg and 3 deg.

The values of X1 through Z2 are the limits of a rectangular box. Conputation of a streamline terminates if it extends outside the box.

Computation of a streamline terminates when the number of steps exceeds FN.

3.5 VELOCITY OUTPUT DATA

Calculation of the flow field velocity is the primary result of PFP; however, from the velocities, various other parameters of interest can be computed. These data are printed and are also recorded on Unit 22 to save for the plot program. Each record is written by a FORTRAN statement

WRITE (22) X,Y,Z,U,V,W,VA,AM,TV,TW,
CP,D,A,A,A,A,A,A,L

The variable (A) is not used.

The variable (L) is an indicator as follows. A value (L = 1) indicates a velocity. A value (L = 2) indicates the start of a streamline, and the data are a copy of the streamline input data. A value (L = 3) indicates that the record is data for one point of the streamline, and L = 4 indicates the end of the streamline. The last record is indicated by L = -999.

When L = 1 or L = 3, the data of the record are as follows.

Col. No.	Variables	Definition
1	x	Coordinates of the point in the velocity field
2	y	
3	z	
4	U	Components of the velocity
5	V	
6	W	
7	VA (printed as | v |)	Magnitude of the velocity, $\|\vec{v}\| = \sqrt{u^2 + v^2 + w^2}$
8	AM (printed as M)	Local Mach number, $M = \frac{M_\infty(\|\vec{v}\|/\|\vec{v}_\infty\|)}{\sqrt{1+1/2(k-1)M_\infty^2\,[1-(\|\vec{v}\|/\|\vec{v}_\infty\|)^2]}}$ where k is the ratio of specific heats
9	TV (printed as A(V,U))	Flow angularity in degrees, $\tan^{-1}$ [v/u]
10	TW (printed as A(W,U))	Flow angularity in degrees, $\tan^{-1}$ [w/u]
11	CP	Pressure coefficient $C_p = 1 - (\|\vec{v}\|/\|\vec{v}_\infty\|)^2$
12	D (printed as M-MI)	$M - M_\infty$

These data are computed and printed by the subroutine VELOUT. If alternate parameters are desired or if a format change is needed, only a minor modification of this subroutine would be required.

3.6 ALLOCATION OF MEMORY AND THE GENERAL LOGIC

The large arrays needed during execution of PFP are in COMMON as:

COMMON/ARRAYS/L(N), X(4,N), Y(4,N), Z(4,N),CX(N), CY(N), CZ(N), BX(N), BY(N), BZ(N), H(N)

where

Variables	Definitions
L	Types of singularities
X, Y, Z	Coordinates of the singularities Four locations reserved per singularity, of which only the first is used by Type 1
CX, CY, CZ	Coordinates of the control points Later the strengths of the singularities are stored in CX
BX, BY, BZ	Components of unit normal vectors
H	Extra array used in computation of the system of equations

The control points and unit vectors are used only in the computation of the system of equations, and thus, after the system has been computed, the memory beginning with CX(1), and including the remaining memory reserved by the COMMON block, can be used in the solution of the system of equations. It is important that this memory be as large as possible since the larger the memory the quicker the solution is effected.

The reservation of memory is made in subroutine SIZE. To redimension, one needs only to change the two integer constants in this routine, thus the program is easily dimensioned to use whatever memory is available.

The allocation of memory is made in subroutine SCRIMP. An overview of the logic can be obtained by analyzing the main program and the subroutine CHAIN. The functions of the basic subroutines are as follows.

Subroutine	Function
MODEL	Input model data
STRETCH	Transform model according to Goethert's Rule
SYSTEM	Compute the system of equations
LSYSEQ	Solve the system of equations
CHECK	Check the solution
USER	Compute velocities and streamlines as directed by velocity input data

4.0 POTENTIAL FLOW PLOT PROGRAM

It is practically impossible to be certain all singularities are input correctly by checking a tabulation of the coordinates. Similarly, significant trends in the velocities and streamlines can be overlooked if one just looks over a tabulation of the output. Such difficulties are readily resolved by a plot program Model errors are usually conspicuously evident, and the flow field can be visualized by examining various plots.

The Potential Flow Plot Program was written for the CalComp, Model 765 (hardcopy) or 835 (CRT) plotter. For each view, the program performs a transformation of the three-dimensional data onto a plane, scales it, and plots it. Also available is the capability of producing contour plots of the flow field.

4.1 DATA SETS FOR THE PLOT PROGRAM

Data sets for the plot program are listed below:

Data Set	Description
5	Card input data
6	Printed output
11	Model input data; same as for PFP
12	Velocity input data; same as the velocity output data of PFP
20	Work space; enough space should be allocated to hold both the model and the velocity data

In addition, at AEDC the program output is on tape, PLOTTAPE, which drives the off-line plotter.

4.2 CARD INPUT DATA FOR THE PLOT PROGRAM

The plot program first reads three input cards as follows:

Card	Variables	Format
1	LABEL	(18A4)
2	AN,AT,AV,TX,TY,TZ,VMAX	(7E10.0)
3	LPLOTR,INCHES,LBODY,LTROL, LVELY,LSTRM	(6I5)

Variable	Definition
LABEL	A 72-character title which appears on all plots
AN	Length of normal vectors in model units
AT	Length of trails of Type 3 singularities in model units
AV	Length a unit velocity vector is to be plotted in model units
TX, TY, TZ	Angles in degrees the trails of Type 3 singularities make with the three axes
VMAX	Velocities greater than this value will not be plotted
LPLOTR	Plotter model 765 - Hard copy 835 - CRT
INCHES	Maximum length of plots in inches; has a default value of 16 if left blank, and a maximum value of 16 if CRT
LBODY	0 - Don't plot model 1 - Plot model
LTROL	0 - Don't plot control points 1 - Plot control points

LVELY	0 - Don't plot velocities 1 - Plot velocities
LSTRM	0 - Don't plot streamlines 1 - Plot streamlines

VIEW DATA. The following data are read for each view to be plotted:

Variables	Format
LVIEW,LSCALE,LPOV	(315)

Variables	Description
LVIEW	1 - YZ view 2 - XZ view 3 - XY view 4 - Isometric 5 - Perspective -1 - Contour plot 0 - Plotting completed
LSCALE	0 - Compute scale 1 - Read scale
LPOV	Used only when LVIEW = 5 0 - Compute point of view 1 - Read point of view

If LVIEW = 5 and LPOV = 1, then the next three cards supply point of view data (see Section 4.3).

If LVIEW = -1, then the next card supplies contour data (see Section 4.4).

If LSCALE = 1, then the next card supplies scale data and is as follows:

Variables	Format
X,Y,DX,DY,WX	(5E10.0)

Variables	Description
X, Y	Values of the first tic mark on the horizontal and vertical axis, respectively.
DX, DY	Difference between successive one inch tic marks on the horizontal and vertical axis, respectively
WX	Length in inches of the horizontal axis; must be less than 16 for CRT

When the above data have been read, the view is plotted and a branch is made back to read data for the next view. Description of the data for each view begins at the paragraph labeled "VIEW DATA" above. This loop ends when a value of LVIEW = 0 is read, indicating that all requested plots have been completed.

4.3 PERSPECTIVE PLOTS

The plot program will plot perspective views, that is, views as are seen by the eye. The transformation is the projection of the model from a point onto a plane as is illustrated in Fig. 4. Note that the projection is determined by the three points, labeled A, B, and C, in the figure. The projection plane is perpendicular to the line determined by A and B and is one unit from A toward B. The origin of the axes is the projection of B, and the positive y-axis is determined by the projection of C.

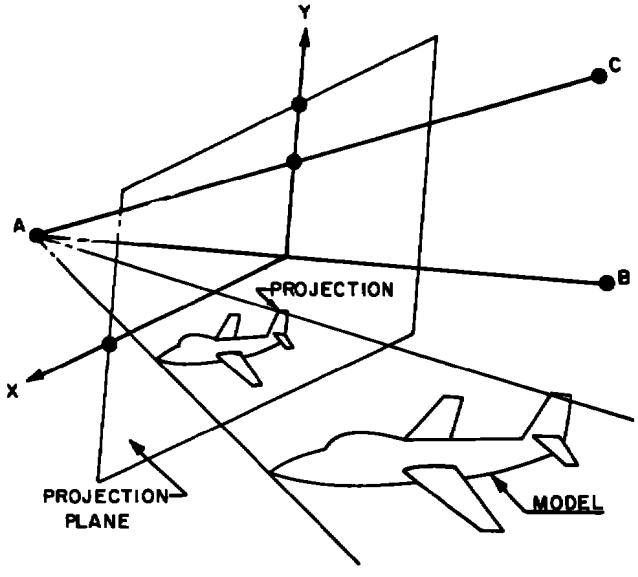


Figure 4. Perspective views.

One can think of the points A, B, and C as determining the point of view. The viewer is at A, looking toward B, and the point C is seen vertically above B. If LPOV = 1, then the coordinates of these three points are read on three cards as follows:

Card	Variables	Format
1	AX,AY,AZ	(3E10.0)
2	BX,BY,BZ	(3E10.0)
3	CX,CY,CZ	(3E10.0)

4.4 CONTOUR PLOTS

In addition to the model and flow field plots, the plot program has the capability of producing contour plots. A contour plot of any parameter Z, of the velocity data set can be plotted as a function of X and Y where X and Y are the horizontal and vertical axes, respectively, of the contour plot and can be any two of the coordinates x, y, or z for a constant value of the third coordinate.

To make a contour plot, the velocity data must be obtained on a uniform grid (net), i.e. - a rectangular array with constant delta X and constant delta Y. The first record of the grid data is always the lower, left-hand corner of the contour plot. Successive records supply data for all the X-values for the first Y-value; then all the X-values for the second Y-value and so on.

The contour card input data are on one card as follows:

Variables	Format
LX,LY,LZ,NX,NY,NZ,NSKIP	(7I5)

Variable	Description
LX, LY	Values 1, 2, or 3 indicating x, y, or z for the horizontal, X-axis and the vertical Y-axis, respectively
LZ	Which parameter of a velocity data record (see Sec. 3.5) is to be plotted; for example, a value of LZ = 8 would indicate a contour plot of the Mach number

Variable	Description
NX, NY	The number of X-values and Y-values, respectively
NZ	The approximate number of Z-values to be plotted; there is a default value of 7 if left blank
NSKIP	This is the number of records on the velocity data set before the first record of the grid

5.0 SAMPLE RUN

It has been found that most models run on PFP are so complicated that a special purpose program must be written to prepare the input. The acceptance of this fact resulted in PFP having both general application and simple operation. This was achieved by inputting the model and velocity data via data sets created by a separate program.

The usual procedure used at AEDC in applying PFP is to run three step jobs. The first step executes a program which prepares the input data sets. These sets are passed to the second step which executes PFP. The output of PFP and the model data are passed to the third step which executes the plot program. A complete listing of a run deck for a typical job of this type is given in Appendix A. The printed output of PFP for this sample run is given in Appendix B. Plots produced are given in Figs. B-1 through B-3.

For models such as cylinders and cones, it is usually not difficult to write a program to produce the input to PFP. For irregular shaped models, the subroutine PART of Step 1 of the sample run has been found useful for preparing the input data. When called, it reads card data:

Variables	Format
X(J), Y(J), Z(J)	(3E10.0)

where J = 1 for the first card, J = 2 for the second card, and so on. Reading continues until a value of X = 1.E50 is read. The subroutine then starts reading card data as follows.

Variables	Format
J1, J2, J3, J4, LT	(5I5)

Each record of this second type of data produces a record of model input data (see Sec. 3.3) with

Variables	Values
X1, Y1, Z1	X(J1), Y(J1), Z(J1)
X2, Y2, Z2	X(J2), Y(J2), Z(J2)
X3, Y3, Z3	X(J3), Y(J3), Z(J3)
X4, Y4, Z4	X(J4), Y(J4), Z(J4)
CX, CY, CZ	1.E50, 1.E50, 1.E50
BX, BY, BZ	1.E50, 1.E50, 1.E50
L	LT

This process continues until a blank card is encountered.

In conclusion, it is noted that PFP was written to solve a specific class of problems. Most of the problems for which it is used at AEDC fall within this class and can be run on the program without modification. However, there are endless ways the program could branch to do various things and no attempt was made to include all these as options in the input. Alternatively, the program was written as logically and as modular as possible with the goal that modifications could be made with minimal effort. Documentation also proceeded with this objective in mind. This programming philosophy has resulted in a much shorter and less complicated program. It is urged that for full utility of the method, one become familiar with the coding and not hesitate to make modifications as the occasions arise.

APPENDIX A
SAMPLE RUN DECK LISTING

Following is a listing of the run deck for the sample problem shown in Appendix B.

SAMPLE RUN DECK LISTING PAGE 1

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
 1    // SEP00341.01,P33A-36A),05569TODD.
 2    // MSGLEVEL=1,
 3    //     CLASS=C,                                                          5
 4    //     TIME=5                                                           11
 5    // EXEC FTGLNKGO
 6          DIMENSION X(500), Y(500), Z(500), J1(500), J2(500), J3(500), J4(50  A    2
 7         10), L(500)                                                         A    3
 8          CALL PART (X,Y,Z)                                                  A    4
 9          CALL PART (X,Y,Z)                                                  A    5
10          CALL PART (X,Y,Z)                                                  A    6
11          CALL PART (X,Y,Z)                                                  A    7
12          CALL PARTS (X,Y,Z,J1,J2,J3,J4,L)                                   A    8
13          CALL CLOSE (11)                                                    A    9
14          CALL VELY                                                          A   10
15          CALL CLOSE (12)                                                    A   11
16          WRITE (6,10)                                                       A   12
17          STOP                                                               A   13
18    C                                                                        A   14
19    10    FORMAT (5HOSTOP)                                                   A   15
20          END                                                                A   16-
21          SUBROUTINE CLOSE (I)                                               B    1
22          DIMENSION C(18)                                                    B    2
23          DATA C/18*0./,L/-999/                                              B    3
24          WRITE (I) C,L                                                      B    4
25          END FILE I                                                         B    5
26          REWIND I                                                           B    6
27          RETURN                                                             B    7
28          END                                                                B    8-
29          SUBROUTINE PART (X,Y,Z)                                            C    1
30          DIMENSION X(1), Y(1), Z(1), D(6)                                   C    2
31          DATA D/6*1.E50/                                                    C    3
32          WRITE (6,90)                                                       C    4
33          DO 10 J=1,100000                                                   C    5
34          READ (5,50) X(J),Y(J),Z(J)                                         C    6
35          WRITE (6,70) J,X(J),Y(J),Z(J)                                      C    7
36          IF (X(J).EQ.1.E50) GO TO 20                                        C    8
37    10    CONTINUE                                                           C    9
38    20    CONTINUE                                                           C   10
39          WRITE (6,100)                                                      C   11
40          DO 30 J=1,100000                                                   C   12
41          READ (5,60) J1,J2,J3,J4,L                                          C   13
42          WRITE (6,80) J,J1,J2,J3,J4,L                                       C   14
43          IF (J1.EQ.0) GO TO 40                                              C   15
44          WRITE (11) X(J1),Y(J1),Z(J1),X(J2),Y(J2),Z(J2),X(J3),Y(J3),Z(J3),X  C   16
45         1(J4),Y(J4),Z(J4),D,L                                               C   17
46    30    CONTINUE                                                           C   18
47    40    CONTINUE                                                           C   19
48          RETURN                                                             C   20
49    C                                                                        C   21
50    50    FORMAT (7E10.0)                                                    C   22
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
      60    FORMAT (14I5)                                                      C  23
      70    FORMAT (I9,1P9E12.4)                                               C  24
      80    FORMAT (9I9)                                                       C  25
      90    FORMAT (1H1,7X,5HJ    X,11X,1HY,11X,1HZ)                           C  26
     100    FORMAT (1H0,7X,1HJ,7X,2HJ1,7X,2HJ2,7X,2HJ3,7X,2HJ4,8X,1HL)          C  27
            END                                                                C  28-
            SUBROUTINE PARTS (X,Y,Z,J1,J2,J3,J4,L)                             D   1
            DIMENSION X(1), Y(1), Z(1), J1(1), J2(1), J3(1), J4(1), L(1), D(6) D   2
            DATA D/6*1.E50/                                                    D   3
            WRITE (6,130)                                                      D   4
            DO 10 J=1,100000                                                   D   5
            READ (5,90) X(J),Y(J),Z(J)                                         D   6
            WRITE (6,110) J,X(J),Y(J),Z(J)                                     D   7
            IF (X(J).EQ.1.E50) GO TO 20                                        D   8
   10       CONTINUE                                                           D   9
   20       CONTINUE                                                           D  10
            N=J-1                                                              D  11
            WRITE (6,140)                                                      D  12
            DO 30 J=1,100000                                                   D  13
            READ (5,100) J1(J),J2(J),J3(J),J4(J),L(J)                          D  14
            WRITE (6,120) J,J1(J),J2(J),J3(J),J4(J),L(J)                       D  15
            IF (J1(J).EQ.0) GO TO 40                                           D  16
   30       CONTINUE                                                           D  17
   40       CONTINUE                                                           D  18
            M=J-1                                                              D  19
            DO 70 I=1,2                                                        D  20
            DO 50 J=1,M                                                        D  21
   50       WRITE (11) X(J1(J)),Y(J1(J)),Z(J1(J)),X(J2(J)),Y(J2(J)),Z(J2(J)),X D  22
           1(J3(J)),Y(J3(J)),Z(J3(J)),X(J4(J)),Y(J4(J)),Z(J4(J)),D,L            D  23
            IF (I.EQ.2) GO TO 80                                               D  24
            DO 60 J=1,N                                                        D  25
   60       Z(J)=-Z(J)                                                         D  26
   70       CONTINUE                                                           D  27
   80       CONTINUE                                                           D  28
            RETURN                                                             D  29
C                                                                              D  30
   90    FORMAT (7E10.0)                                                       D  31
  100    FORMAT (14I5)                                                         D  32
  110    FORMAT (I9,1P9E12.4)                                                  D  33
  120    FORMAT (9I9)                                                          D  34
  130    FORMAT (1H1,7X,5HJ    X,11X,1HY,11X,1HZ)                              D  35
  140    FORMAT (1H0,7X,1HJ,7X,2HJ1,7X,2HJ2,7X,2HJ3,7X,2HJ4,8X,1HL)             D  36
            END                                                                D  37-
            SUBROUTINE VELY                                                    E   1
            DIMENSION D(15)                                                    E   2
            DATA D/.2,2*0.,-1.,16.,-10.,10.,-10.,10.,90.,5*0./                 E   3
            L=1                                                                E   4
            DO 10 JX=5,7,2                                                     E   5
            X=JX                                                               E   6
            DO 10 JZ=1,9                                                       E   7
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
101         Z=2.+.5*(JZ-1)                                                  E   8
102         DO 10 JY=1,7                                                    E   9
103         Y=.5*(JY-1)                                                     E  10
104   10    WRITE (12) X,Y,Z,D,L                                            E  11
105         L=2                                                             E  12
106         X=6.                                                            E  13
107         Z=3.75                                                          E  14
108         DO 20 JY=1,3                                                    E  15
109         Y=.5*JY                                                         E  16
110   20    WRITE (12) X,Y,Z,D,L                                            E  17
111         RETURN                                                          E  18
112   C                                                                     E  19
113         END                                                             E  20-
114   //GO.FT11F001 DD DSN=&&BODY,
115   // UNIT=WORK,
116   // SPACE=(CYL,(1,1),RLSE,,ROUND),
117   // DISP=(NEW,PASS)
118   //GO.FT12F001 DD DSN=&&VELI,
119   // UNIT=WORK,
120   // SPACE=(CYL,(1,1),RLSE,,ROUND),
121   // DISP=(NEW,PASS)
122   //GO.FT05F001 DD *
123   8.          0.          3.75
124   8.88        0.          4.17
125   8.88        .42         4.17
126   8.88        .42         3.75
127   8.88        .42         3.33
128   8.88        0.          3.33
129   9.78        0.          4.17
130   9.78        .42         4.17
131   9.78        .42         3.75
132   9.78        .42         3.33
133   9.78        0.          3.33
134   10.75       0.          4.17
135   10.75       .42         4.17
136   10.75       .42         3.75
137   10.75       .42         3.33
138   10.75       0.          3.33
139   11.85       0.          4.17
140   11.85       .42         4.17
141   11.85       .42         3.75
142   11.85       .42         3.33
143   11.85       0.          3.33
144   13.21       0.          4.17
145   13.21       .42         4.17
146   13.21       .42         3.75
147   13.21       .42         3.33
148   13.21       0.          3.33
149       1.E50
150      1    2    3    1    2
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
151        1    3    4    1    2
152        1    4    5    1    2
153        1    5    6    1    2
154        2    7    8    3    2
155        3    8    9    4    2
156        4    9   10    5    2
157        5   10   11    6    2
158        7   12   13    8    2
159        8   13   14    9    2
160        9   14   15   10    2
161       12   17   18   13    2
162       13   18   19   14    2
163       14   19   20   15    2
164       15   20   21   16    2
165       17   22   23   18    2
166       18   23   24   19    2
167       19   24   25   20    2
168       20   25   26   21    2
169
170    9.78       0.          3.33
171    9.78       .42         3.33
172    10.75      .42         3.33
173    10.75      0.          3.33
174    9.98       0.          3.0
175    9.98       .42         3.0
176    10.45      .42         3.0
177    10.96      .42         3.0
178    10.96      0.          3.0
179    10.29      0.          2.5
180    10.29      .42         2.5
181    10.77      .42         2.5
182    11.26      .42         2.5
183    11.26      0.          2.5
184    10.6       0.          2.0
185    10.6       .42         2.0
186    11.08      .42         2.0
187    11.57      .42         2.0
188    11.57      0.          2.0
189    10.91      0.          1.5
190    10.91      .42         1.5
191    11.4       .42         1.5
192    11.88      .42         1.5
193    11.88      0.          1.5
194    11.21      0.          1.0
195    11.21      .42         1.0
196    11.71      .42         1.0
197    12.19      .42         1.0
198    12.19      0           1.0
199    11.53      0           .5
200    11.53      .5          .5
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
201    12.03      .5        .5
202    12.50      .5        .5
203    12.50      0.        .5
204         1.E50
205        1    5    6    2    2
206        2    6    7    2    2
207        2    7    3    2    2
208        3    7    8    3    2
209        3    8    9    4    2
210        5   10   11    6    2
211        6   11   12    7    2
212        7   12   13    8    2
213        8   13   14    9    2
214       10   15   16   11    2
215       11   16   17   12    2
216       12   17   18   13    2
217       13   18   19   14    2
218       15   20   21   16    2
219       16   21   22   17    2
220       17   22   23   18    2
221       18   23   24   19    2
222       20   25   26   21    2
223       21   26   27   22    2
224       22   27   28   23    2
225       23   28   29   24    2
226       25   30   31   26    2
227       26   31   32   27    2
228       27   32   33   28    2
229       28   33   34   29    2
230
231    12.5       0.         -.5
232    12.13      0.         -.5
233    11.83      0.          0.
234    11.53      0.         .5
235    12.5       .5         -.5
236    12.13      .5         -.5
237    11.83      .5          0.
238    11.53      .5         .5
239    12.5       .5         -.5
240    12.27      .5          0.
241    12.03      .5         .5
242    13.24      .5         -.5
243    13.13      .5          0.
244    12.5       .5         .5
245    12.5       0.         .5
246    13.0       .5         .5
247    13.0       0.         .5
248    13.82      .5         -.5
249    13.82      .5          0.
250    13.82      .5         .5
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
13.82     0.        .5
     1.E50
    1    5    6    2    2
    2    6    7    3    2
    3    7    8    4    2
    6    9   10    7    2
    7   10   11    8    2
    9   12   13   10    2
   10   13   14   11    2
   12   18   19   13    2
   13   19   20   16    2
   13   16   14   13    2
   14   16   17   15    2
   16   20   21   17    2

12.5      0.        -.5
12.5      .5        -.5
13.24     .5        -.5
13.82     .5        -.5
13.82     0.        -.5
12.75     0.        -1.
12.75     .5        -1.
13.32     .5        -1.
13.82     .5        -1.
13.82     0.        -1.
13.0      0.        -1.55
13.0      .5        -1.55
13.4      .5        -1.55
13.82     .5        -1.55
13.82     0.        -1.55
13.1      0.        -2.25
13.1      .42       -2.25
13.47     .42       -2.25
13.82     .42       -2.25
13.82     0.        -2.25
13.2      0.        -2.95
13.2      .42       -2.95
13.55     .42       -2.95
13.82     .42       -2.95
13.82     0.        -2.95
     1.E50
    1    6    7    2    2
    2    7    8    3    2
    3    8    9    4    2
    4    9   10    5    2
    6   11   12    7    2
    7   12   13    8    2
    8   13   14    9    2
    9   14   15   10    2
   11   16   17   12    2
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
301       12   17   18   13    2
302       13   18   19   14    2
303       14   19   20   15    2
304       16   21   22   17    2
305       17   22   23   18    2
306       18   23   24   19    2
307       19   24   25   20    2
308
309    12.85     0.        0.
310    13.75     .37       0.
311    13.75     .36       .1
312    13.75     .26       .26
313    13.75     .1        .36
314    13.75     0.        .37
315    14.27     .57       0.
316    14.27     .54       .14
317    14.27     .41       .41
318    14.27     .14       .54
319    14.27     0.        .57
320    14.85     .8        0.
321    14.85     .77       .21
322    14.85     .56       .56
323    14.85     .21       .77
324    14.85     0.        .8
325    15.9      .8        0.
326    15.9      .77       .21
327    15.9      .56       .56
328    15.9      .21       .77
329    15.9      0.        .8
330    16.03     .67       0.
331    16.03     .64       .17
332    16.03     .48       .48
333    16.03     .17       .64
334    16.03     0.        .67
335    17.3      .67       0.
336    17.3      .67       .45
337    17.3      .45       .67
338    17.3      0.        .67
339    18.       0.        .67
340    18.3      .67       0.
341    18.3      .67       .56
342    18.3      .56       .67
343    18.3      .2        .67
344    19.04     .67       0.
345    19.04     .67       .67
346    19.04     .33       .67
347    20.5      .67       0.
348    20.5      .67       .67
349    20.36     .33       .67
350    22.3      .67       0.
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
22.3      .67       .67
22.06     .33       .67
24.5      .67       0.
24.5      .67       .67
23.97     .33       .67
26.37     .3        0.
26.37     .3        .67
26.37     0.        .67
28.       0.        0.
28.       0.        .67
18.       0.        .67
18.       0.        1.92
18.       0.        3.7
18.       0.        5.77
18.       0.        8.
18.3      .2        .67
18.3      .2        1.92
18.3      .2        3.7
18.3      .2        5.77
18.3      .2        8.0
19.04     .33       .67
19.04     .33       1.92
19.04     .33       3.7
19.04     .33       5.77
19.04     .33       8.
20.36     .33       .67
20.3      .33       1.92
20.22     .33       3.7
20.17     .33       5.77
20.08     .33       8.
22.06     .33       .67
21.95     .33       1.92
21.83     .33       3.7
21.7      .33       5.77
21.54     .33       8.
23.97     .33       .67
23.83     .33       1.92
23.63     .33       1.7
23.4      .33       5.77
23.16     .33       8.0
26.37     0.        .67
26.22     0.        1.92
26.04     0.        3.7
25.82     0.        5.77
25.58     0.        8.0
1.     E50
    1    2    3    1    2
    1    3    4    1    2
    1    4    5    1    2
    1    5    6    1    2
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
        1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
401      2     7     8     3     2
402      3     8     9     4     2
403      4     9    10     5     2
404      5    10    11     6     2
405      7    12    13     8     2
406      8    13    14     9     2
407      9    14    15    10     2
408     10    15    16    11     2
409     12    17    18    13     2
410     13    18    19    14     2
411     14    19    20    15     2
412     15    20    21    16     2
413     17    22    23    18     2
414     18    23    24    19     2
415     19    24    25    20     2
416     20    25    26    21     2
417     22    27    28    23     2
418     23    28    28    24     2
419     24    28    29    25     2
420     25    29    30    26     2
421     29    31    31    30     2
422     27    32    33    28     2
423     28    33    34    29     2
424     29    34    35    31     2
425     32    36    37    33     2
426     33    37    37    34     2
427     34    37    38    35     2
428     36    39    40    37     2
429     37    40    41    38     2
430     39    42    43    40     2
431     40    43    44    41     2
432     42    45    46    43     2
433     43    46    47    44     2
434     45    48    49    46     2
435     46    49    50    47     2
436     48    51    52    49     2
437     49    52    52    50     2
438     53    58    59    54     2
439     54    59    60    55     2
440     55    60    61    56     2
441     56    61    62    57     2
442     58    63    64    59     2
443     59    64    65    60     2
444     60    65    66    61     2
445     61    66    67    62     2
446     63    68    69    64     2
447     64    69    70    65     2
448     65    70    71    66     2
449     66    71    72    67     2
450     68    73    74    69     2
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
   69   74   75   70    2
   70   75   76   71    2
   71   76   77   72    2
   73   78   79   74    2
   74   79   80   75    2
   75   80   81   76    2
   76   81   82   77    2
   78   83   84   79    2
   79   84   85   80    2
   80   85   86   81    2
   81   86   87   82    2

//     EXEC FTHLNKGO                                                          37
C      POTENTIAL FLOW PROGRAM      DONALD C. TODD      JAN 3, 1975          A   2
       COMMON /ALPHA/ LABEL(18)                                             A   3
       COMMON /ARRAYS/ X(1)                                                 A   4
       COMMON /FIXED/ NW,LX,LY,LZ                                           A   5
       COMMON /FLOAT/ PROX,AX,AY,AZ,CAY,EM,FS,FX,FY,FZ                      A   6
       COMMON /SKIMP/ MDIM,NDIM,NEED,LA,LB,LC,LD,LE,LF,LG,LH,LI,LJ,LK       A   7
       READ (5,10) LABEL                                                    A   8
       READ (5,30) AX,AY,AZ,PROX                                            A   9
       READ (5,30) FX,FY,FZ,FS,EM,CAY                                       A  10
       READ (5,20) LX,LY,LZ,NW                                              A  11
       IF (CAY.EQ.0.) CAY=1.4                                               A  12
       IF (NW.EQ.0) CALL PRNTM (NW)                                         A  13
       CALL INITAL                                                          A  14
       CALL CHAIN (X(LA),X(LB),X(LC),X(LD),X(LE),X(LF),X(LG),X(LH),X(LI),   A  15
      1X(LJ))                                                               A  16
       WRITE (6,40)                                                         A  17
       STOP                                                                 A  18
C                                                                           A  19
10     FORMAT (18A4)                                                        A  20
20     FORMAT (14I5)                                                        A  21
30     FORMAT (7E10.0)                                                      A  22
40     FORMAT (14HOJOB COMPLETED)                                           A  23
       END                                                                  A  24-
       SUBROUTINE CHAIN (X,Y,Z,CX,CY,CZ,BX,BY,BZ,A)                         B   1
       DIMENSION X(1), Y(1), Z(1), CX(1), CY(1), CZ(1), BX(1), BY(1), BZ(   B   2
      11), A(1)                                                             B   3
       CALL MODEL (X,Y,Z,CX,CY,CZ,BX,BY,BZ)                                B   4
       CALL STRECH (X,Y,Z,CX,CY,CZ,BX,BY,BZ)                               B   5
       CALL SYSTEM (X,Y,Z,CX,CY,CZ,BX,BY,BZ,A)                             B   6
       CALL LSYSEQ (CX)                                                     B   7
       CALL CHECK (CX,CY)                                                   B   8
       CALL USER (X,Y,Z,CX)                                                 B   9
       RETURN                                                               B  10
       END                                                                  B  11-
       FUNCTION ATAND (X,Y)                                                 C   1
       DATA DPR/57.29578/                                                   C   2
       IF (X.NE.0.) GO TO 10                                                C   3
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
      IF (Y.NE.0.) GO TO 10                                                  C   4
      ATAND=0.                                                               C   5
      RETURN                                                                 C   6
10    ATAND=DPR*ATAN2(X,Y)                                                   C   7
      RETURN                                                                 C   8
      END                                                                    C   9-
      SUBROUTINE BLKIN (JU,N1,MA,MM,MB,LB,LE,A)                              D   1
      DIMENSION A(N1,1)                                                      D   2
      MB=0                                                                   D   3
      DO 10 JB=1,100000                                                      D   4
      READ (JU) M,LB,LE,((A(J,MB+K),J=1,N1),K=1,M)                           D   5
      MB=MB+M                                                                D   6
      IF (LB.EQ.1) GO TO 20                                                  D   7
      IF (LE.EQ.1) RETURN                                                    D   8
      IF ((MB+MM).GT.MA) RETURN                                              D   9
10    CONTINUE                                                               D   10
      ENTRY BLKOUT(JU,N1,N2,M,LB,LE,A)                                       D   11
      JB=N1-N2                                                               D   12
      WRITE (JU) M,LB,LE,((A(JB+J,K),J=1,N2),K=1,M)                          D   13
      IF (LB.EQ.0) RETURN                                                    D   14
      END FILE JU                                                            D   15
20    REWIND JU                                                              D   16
      RETURN                                                                 D   17
      END                                                                    D   18-
      SUBROUTINE CHECK (X,A)                                                 E   1
      DIMENSION X(1), A(N)                                                   E   2
      COMMON /FIXED/ N                                                       E   3
      EM=0.                                                                  E   4
      DO 20 J=1,N                                                            E   5
      READ (90) A,C                                                          E   6
      S=C                                                                    E   7
      TM=ABS(C)                                                              E   8
      DO 10 K=1,N                                                            E   9
      T=A(K)*X(K)                                                            E   10
      TM=AMAX1(TM,ABS(T))                                                    E   11
10    S=S-T                                                                  E   12
      E=ABS(S/TM)                                                            E   13
20    EM=AMAX1(EM,E)                                                         E   14
      REWIND 90                                                              E   15
      WRITE (6,30) EM                                                        E   16
      RETURN                                                                 E   17
C                                                                            E   18
30    FORMAT (27HORELATIVE ERROR OF SOLUTION,1PE10.2)                        E   19
      END                                                                    E   20-
      SUBROUTINE CONTRL (X,Y,Z,CX,CY,CZ)                                     F   1
      DIMENSION X(4), Y(4), Z(4)                                             F   2
      CX=.25*(X(1)+X(2)+X(3)+X(4))                                           F   3
      CY=.25*(Y(1)+Y(2)+Y(3)+Y(4))                                           F   4
      CZ=.25*(Z(1)+Z(2)+Z(3)+Z(4))                                           F   5
      RETURN                                                                 F   6
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
      END                                                                F   7-
      FUNCTION COSD (X)                                                  G   1
      DATA RPD/.01745329/                                                G   2
      IF (X.EQ.-180.) GO TO 10                                           G   3
      IF (X.EQ.-90.) GO TO 20                                            G   4
      IF (X.EQ.0.) GO TO 30                                              G   5
      IF (X.EQ.90.) GO TO 20                                             G   6
      IF (X.EQ.180.) GO TO 10                                            G   7
      IF (X.EQ.270.) GO TO 20                                            G   8
      IF (X.EQ.360.) GO TO 30                                            G   9
      COSD=COS(RPD*X)                                                    G  10
      RETURN                                                             G  11
10    COSD=-1.                                                           G  12
      RETURN                                                             G  13
20    COSD=0.                                                            G  14
      RETURN                                                             G  15
30    COSD=1.                                                            G  16
      RETURN                                                             G  17
      END                                                                G  18-
      SUBROUTINE ELIMIN (N,M,L2,A)                                       H   1
      DIMENSION A(N,1)                                                   H   2
      M1=M+1                                                             H   3
      ML=M+L2                                                            H   4
      DO 30 J=M1,ML                                                      H   5
      DO 20 K=M1,N                                                       H   6
      S=0.                                                               H   7
      DO 10 L=1,M                                                        H   8
10    S=S+A(L,J)*A(K,L)                                                  H   9
20    A(K,J)=A(K,J)-S                                                    H  10
30    CONTINUE                                                           H  11
      RETURN                                                             H  12
      END                                                                H  13-
      SUBROUTINE GAUSS (N,M,P,A)                                         I   1
C     DC TODD  04/09/73  GAUSS ELIMINATION                               I   2
      DIMENSION A(N,1)                                                   I   3
      MP1=M+1                                                            I   4
      IF (N.EQ.1) GO TO 20                                               I   5
      MM1=M-1                                                            I   6
      DO 10 K=1,MM1                                                      I   7
      P=A(K,K)                                                           I   8
      IF (P.EQ.0.) RETURN                                                I   9
      Q=1./P                                                             I  10
      K1=K+1                                                             I  11
      DO 10 J=K1,M                                                       I  12
      F=A(K,J)*Q                                                         I  13
      DO 10 L=K1,N                                                       I  14
10    A(L,J)=A(L,J)-F*A(L,K)                                             I  15
20    CONTINUE                                                           I  16
      DO 50 JC=1,M                                                       I  17
      J=MP1-JC                                                           I  18
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
601           J1=J+1                                                          I  19
602           P=A(J,J)                                                        I  20
603           DO 50 K=MP1,N                                                   I  21
604           Q=A(K,J)                                                        I  22
605           IF (J.EQ.4) GO TO 40                                            I  23
606           DO 30 L=J1,M                                                    I  24
607     30    Q=Q-A(L,J)*A(K,L)                                               I  25
608     40    A(K,J)=Q/P                                                      I  26
609     50    CONTINUE                                                        I  27
610           RETURN                                                          I  28
611           END                                                             I  29-
612           SUBROUTINE INITAL                                               J   1
613           COMMON /FIXED/ NW,LX,LY,LZ                                      J   2
614           COMMON /FLOAT/ PS,A(3),CA,EM,FS,F(3),G(3),H(3),EMS,BETA,RB,RBS  J   3
615           COMMON /SKIMP/ MDIM,NDIM,NEED                                   J   4
616           DATA TOL/1.E-5/                                                 J   5
617           WRITE (6,70)                                                    J   6
618           WRITE (6,50) LX,LY,LZ                                           J   7
619           WRITE (6,80)                                                    J   8
620           WRITE (6,60) A,PS                                               J   9
621           WRITE (6,90)                                                    J  10
622           WRITE (6,60) F,FS,EM,CA                                         J  11
623           DO 10 J=1,3                                                     J  12
624           A(J)=COSD(A(J))                                                 J  13
625     10    F(J)=COSD(F(J))                                                 J  14
626           CALL WIND                                                       J  15
627           AE=1.-(A(1)**2+A(2)**2+A(3)**2)                                 J  16
628           FE=1.-(F(1)**2+F(2)**2+F(3)**2)                                 J  17
629           GE=1.-(G(1)**2+G(2)**2+G(3)**2)                                 J  18
630           HE=1.-(H(1)**2+H(2)**2+H(3)**2)                                 J  19
631           PS=PS*PS                                                        J  20
632           CA=.5*(CA-1.)                                                   J  21
633           EMS=EM**2                                                       J  22
634           BETA=SQRT(1.-EMS)                                               J  23
635           RB=1./BETA                                                      J  24
636           RBS=RB**2                                                       J  25
637           CALL SIZE (NDIM)                                                J  26
638           CALL SCRIMP                                                     J  27
639           WRITE (6,100)                                                   J  28
640           WRITE (6,50) NW,MDIM,NDIM,NEED                                  J  29
641           WRITE (6,110)                                                   J  30
642           WRITE (6,60) PS,CA,EMS,BETA,RB                                  J  31
643           WRITE (6,120)                                                   J  32
644           WRITE (6,60) A,AE                                               J  33
645           WRITE (6,130)                                                   J  34
646           WRITE (6,60) F,FE                                               J  35
647           WRITE (6,60) G,GE                                               J  36
648           WRITE (6,60) H,HE                                               J  37
649           LD=0                                                            J  38
650           IF (NDIM.GE.NFED) GO TO 20                                      J  39
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
      WRITE (6,140)                                                          J  40
      LD=LD+1                                                                J  41
20    IF (ABS(AE).GT.TOL) GO TO 30                                           J  42
      IF (ABS(FE).GT.TOL) GO TO 30                                           J  43
      IF (ABS(GE).GT.TOL) GO TO 30                                           J  44
      IF (ABS(HE).GT.TOL) GO TO 30                                           J  45
      GO TO 40                                                               J  46
30    WRITE (6,150)                                                          J  47
      LD=LD+1                                                                J  48
40    CONTINUE                                                               J  49
      IF (LD.GT.0) STOP                                                      J  50
      RETURN                                                                 J  51
C                                                                            J  52
50    FORMAT (12I10)                                                         J  53
60    FORMAT (1P8E15.6)                                                      J  54
70    FORMAT (1H1,7X,2HLX,8X,2HLY,8X,2HLZ)                                   J  55
80    FORMAT (1H0,4X,2HAX,13X,2HAY,13X,2HAZ,13X,4HPROX)                      J  56
90    FORMAT (1H0,4X,2HFX,13X,2HFY,13X,2HFZ,13X,2HFS,13X,2HMI,13X,1HK)       J  57
100   FORMAT (1H0,7X,2HNW,6X,4HMDIM,6X,4HNDIM,6X,4HNEED)                     J  58
110   FORMAT (1H0,4X,2HPS,13X,2HCA,13X,4HN**2,11X,4HBETA,11X,6H1/BETA)       J  59
120   FORMAT (1H0,4X,12HTRAIL VECTOR,33X,1HE)                                J  60
130   FORMAT (1H0,4X,33HBODY - WIND TRANSFORMATION MATRIX,12X,1HE)           J  61
140   FORMAT (10HONEED>NDIM)                                                 J  62
150   FORMAT (6HOE>TOL)                                                      J  63
      END                                                                    J  64-
      SUBROUTINE LSYSEQ (A)                                                  K   1
C     DONALD C. TODD  06/15/73                                               K   2
C     BLOCK GAUSS-JORDON ELIMINATION                                         K   3
      DIMENSION A(1)                                                         K   4
      COMMON /FIXED/ M                                                       K   5
      COMMON /SKIMP/ NDIM                                                    K   6
      N=M+1                                                                  K   7
      CALL SYSIN (M,N,NDIM,JU1,JU2,MM2,N2,A)                                 K   8
      WRITE (6,60)                                                           K   9
      WRITE (6,90)                                                           K  10
      WRITE (6,100) JU1,JU2,MM2,N2                                           K  11
10    CONTINUE                                                               K  12
      MM1=MM2                                                                K  13
      N1=N2                                                                  K  14
      JU3=JU1                                                                K  15
      JU1=JU2                                                                K  16
      JU2=JU3                                                                K  17
      MA=NDIM/(2*N1)                                                         K  18
      CALL BLKIN (JU1,N1,MA,MM1,M1,LB,LE1,A)                                 K  19
      CALL GAUSS (N1,M1,P,A)                                                 K  20
      IF (P.EQ.0.) GO TO 40                                                  K  21
      N2=N1-M1                                                               K  22
      MM2=N1                                                                 K  23
      J1=M1*N1                                                               K  24
      MA=MIN0((NDIM-J1)/N1,NDIM/(2*N2))                                      K  25
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
701         J1=J1+1                                                          K  26
702   20    IF (LB.EQ.1) GO TO 30                                            K  27
703         CALL BLKIN (JU1,N1,MA,MM1,M2,LB,LE,A(J1))                        K  28
704         CALL ELIMIN (N1,M1,M2,A)                                         K  29
705         CALL BLKOUT (JU2,N1,N2,M2,0,LE,A(J1))                            K  30
706         MM2=MAX0(MM2,M2)                                                 K  31
707         GO TO 20                                                         K  32
708   30    CALL BLKOUT (JU2,N1,N2,M1,1,LE1,A)                               K  33
709         WRITE (6,100) JU1,JU2,MM2,N2                                     K  34
710         IF (LE1.EQ.1) GO TO 50                                           K  35
711         GO TO 10                                                         K  36
712   40    WRITE (6,70)                                                     K  37
713         STOP                                                             K  38
714   50    CALL XOUT (JU2,N2,A)                                             K  39
715         WRITE (6,80)                                                     K  40
716         RETURN                                                           K  41
717   C                                                                      K  42
718   60    FORMAT (17HOSOLUTION STARTED)                                    K  43
719   70    FORMAT (14HOMETHOD FAILED)                                       K  44
720   80    FORMAT (14HOSYSTEM SOLVED)                                       K  45
721   90    FORMAT (1HO,5X,3HJU1,6X,3HJU2,6X,3HMM2,7X,2HN2)                  K  46
722   100   FORMAT (9I9)                                                     K  47
723         END                                                              K  48-
724         SUBROUTINE MODEL (X,Y,Z,CX,CY,CZ,BX,BY,BZ)                       L   1
725         DIMENSION X(4,1), Y(4,1), Z(4,1), CX(1), CY(1), CZ(1), BX(1), BY(1  L   2
726        1), BZ(1)                                                         L   3
727         COMMON /ARRAYS/ ITR(1)                                           L   4
728         COMMON /FIXED/ NW                                                L   5
729         NE=0                                                             L   6
730         DO 10 K=1,NW                                                     L   7
731         READ (11) (X(J,K),Y(J,K),Z(J,K),J=1,4),CX(K),CY(K),CZ(K),BX(K),BY(  L   8
732        1K),BZ(K),ITR(K)                                                  L   9
733         IF (BX(K).EQ.1.E51) GO TO 10                                     L  10
734         IF (CX(K).EQ.1.E50) CALL CONTRL (X(1,K),Y(1,K),Z(1,K),CX(K),CY(K),  L  11
735        1CZ(K))                                                           L  12
736         IF (BX(K).NE.1.E50) GO TO 10                                     L  13
737         CALL NORMAL (X(1,K),Y(1,K),Z(1,K),BX(K),BY(K),BZ(K),LE)          L  14
738         IF (LE.EQ.0) GO TO 10                                            L  15
739         NE=1                                                             L  16
740         WRITE (6,20) K                                                   L  17
741   10    CONTINUE                                                         L  18
742         REWIND 11                                                        L  19
743         IF (NE.NE.0) STOP                                                L  20
744         RETURN                                                           L  21
745   C                                                                      L  22
746   20    FORMAT (I9,12H ZERO NORMAL)                                      L  23
747         END                                                              L  24-
748         SUBROUTINE NORMAL (X,Y,Z,CX,CY,CZ,L)                             M   1
749         DIMENSION X(4), Y(4), Z(4)                                       M   2
750         AX=X(4)-X(2)                                                     M   3
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
751         AY=Y(4)-Y(2)                                                    M   4
752         AZ=Z(4)-Z(2)                                                    M   5
753         BX=X(3)-X(1)                                                    M   6
754         BY=Y(3)-Y(1)                                                    M   7
755         BZ=Z(3)-Z(1)                                                    M   8
756         CX=AY*BZ-AZ*BY                                                  M   9
757         CY=AZ*BX-AX*BZ                                                  M  10
758         CZ=AX*BY-AY*BX                                                  M  11
759         F=SQRT(CX**2+CY**2+CZ**2)                                       M  12
760         IF (F.EQ.0.) GO TO 10                                           M  13
761         L=0                                                             M  14
762         F=1./F                                                          M  15
763         CX=F*CX                                                         M  16
764         CY=F*CY                                                         M  17
765         CZ=F*CZ                                                         M  18
766         RETURN                                                          M  19
767   10    L=1                                                             M  20
768         RETURN                                                          M  21
769         END                                                             M  22-
770         SUBROUTINE PAGE (I,J,N)                                         N   1
771         COMMON /ALPHA/ LABEL(18)                                        N   2
772         J=J+I                                                           N   3
773         IF (J.LE.N) RETURN                                              N   4
774         J=I                                                             N   5
775         WRITE (6,10) LABEL                                              N   6
776         RETURN                                                          N   7
777   C                                                                     N   8
778   10    FORMAT (1H1,18A4)                                               N   9
779         END                                                             N  10-
780         SUBROUTINE POINT (END,A,B,C,X,Y,Z,U,V,W)                        O   1
781         COMMON /FLOAT/ PS                                               O   2
782         RX=X-A                                                          O   3
783         RY=Y-B                                                          O   4
784         RZ=Z-C                                                          O   5
785         RS=RX**2+RY**2+RZ**2                                            O   6
786         IF (RS.LE.PS) GO TO 10                                          O   7
787         F=END/(12.56637*RS*SQRT(RS))                                    O   8
788         U=F*RX                                                          O   9
789         V=F*RY                                                          O  10
790         W=F*RZ                                                          O  11
791         RETURN                                                          O  12
792   10    U=0.                                                            O  13
793         V=0.                                                            O  14
794         W=0.                                                            O  15
795         RETURN                                                          O  16
796         END                                                             O  17-
797         SUBROUTINE PRNTN (N)                                            P   1
798         DIMENSION C(18)                                                 P   2
799         N=0                                                             P   3
800         K=0                                                             P   4
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
901         J=1000                                                            P   5
902   10    READ (11) C,L                                                     P   6
903         IF (L.EQ.-999) GO TO 30                                           P   7
904         N=N+1                                                             P   8
905         CALL PAGE (2,J,50)                                                P   9
906         IF (J.GT.2) GO TO 20                                              P  10
907         K=K+1                                                             P  11
908         WRITE (6,40) K                                                    P  12
909   20    WRITE (6,50) N,(C(I),I=1,6),(C(I),I=13,15)                        P  13
910         WRITE (6,60) L,(C(I),I=7,12),(C(I),I=16,18)                       P  14
911         GO TO 10                                                          P  15
912   30    REWIND 11                                                         P  16
913         RETURN                                                            P  17
914   C                                                                       P  18
915   40    FORMAT (19H MODEL DATA    PAGE,I4)                                P  19
916   50    FORMAT (I6,2X,1P3E12.4,1X,3E12.4,3X,3E12.4)                       P  20
917   60    FORMAT (I8,1P3E12.4,1X,3E12.4,3X,3E12.4)                          P  21
918         END                                                               P  22-
919         SUBROUTINE RAY (G,AX,AY,AZ,EX,EY,EZ,CX,CY,CZ,DX,DY,DZ)            Q   1
920         COMMON /FLUAT/ PS                                                 Q   2
921         FX=CX-AX                                                          Q   3
922         FY=CY-AY                                                          Q   4
923         FZ=CZ-AZ                                                          Q   5
924         PS=FX*FX+FY*FY+FZ*FZ                                              Q   6
925         IF (PS.EQ.0.) GO TO 10                                            Q   7
926         DX=EY*FZ-EZ*FY                                                    Q   8
927         DY=EZ*FX-CX*FZ                                                    Q   9
928         DZ=EX*FY-EY*FX                                                    Q  10
929         DS=DX*DX+DY*DY+DZ*DZ                                              Q  11
930         IF (DS.LE.PS) GO TO 10                                            Q  12
931         CT1=(EX*FX+EY*FY+EZ*FZ)/SQRT(PS)                                  Q  13
932         C=G*(CT1+1.)/(12.56637*DS)                                        Q  14
933         DX=C*DX                                                           Q  15
934         DY=C*DY                                                           Q  16
935         DZ=C*DZ                                                           Q  17
936         RETURN                                                            Q  18
937   10    DX=0.                                                             Q  19
938         DY=0.                                                             Q  20
939         DZ=0.                                                             Q  21
940         RETURN                                                            Q  22
941         END                                                               Q  23-
942         SUBROUTINE SCRIMP                                                 R   1
943         COMMON /FIXED/ NW                                                 R   2
944         COMMON /SKIMP/ MDIM,NDIM,NEED,L(1)                                R   3
945         L(1)=1+NW                                                         R   4
946         LA=4*NW                                                           R   5
947         DO 10 K=2,4                                                       R   6
948   10    L(K)=L(K-1)+LA                                                    R   7
949         DO 20 K=5,11                                                      R   8
950   20    L(K)=L(K-1)+NW                                                    R   9
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
851         NDIM=NDIM-L(4)+1                                                R  10
852         NEED=L(11)                                                      R  11
853         RETURN                                                          R  12
854         END                                                             R  13-
855         SUBROUTINE SEGM (G,AX,AY,AZ,BX,BY,BZ,CX,CY,CZ,DX,DY,DZ)         S   1
856         COMMON /FLOAT/ PS                                               S   2
857         EX=BX-AX                                                        S   3
858         EY=BY-AY                                                        S   4
859         EZ=BZ-AZ                                                        S   5
860         ES=EX*EX+EY*EY+EZ*EZ                                            S   6
861         IF (ES.EQ.0.) GO TO 10                                          S   7
862         FX=CX-AX                                                        S   8
863         FY=CY-AY                                                        S   9
864         FZ=CZ-AZ                                                        S  10
865         FS=FX*FX+FY*FY+FZ*FZ                                            S  11
866         IF (FS.EQ.0.) GO TO 10                                          S  12
867         DX=EY*FZ-EZ*FY                                                  S  13
868         DY=EZ*FX-EX*FZ                                                  S  14
869         DZ=EX*FY-EY*FX                                                  S  15
870         DS=DX*DX+DY*DY+DZ*DZ                                            S  16
871         IF (DS.LE.ES*PS) GO TO 10                                       S  17
872         HS=(CX-BX)**2+(CY-BY)**2+(CZ-BZ)**2                             S  18
873         F=SQRT(FS)                                                      S  19
874         H=SQRT(HS)                                                      S  20
875         CT1=(FS-HS+ES)/F                                                S  21
876         CT2=(FS-HS-ES)/H                                                S  22
877         C=G*(CT1-CT2)/(25.13274*DS)                                     S  23
878         DX=C*DX                                                         S  24
879         DY=C*DY                                                         S  25
880         DZ=C*DZ                                                         S  26
881         RETURN                                                          S  27
882   10    DX=0.                                                           S  28
883         DY=0.                                                           S  29
884         DZ=0.                                                           S  30
885         RETURN                                                          S  31
886         END                                                             S  32-
887         SUBROUTINE SIZE (NDIM)                                          T   1
888         COMMON /ARRAYS/ A(15000)                                        T   2
889         NDIM=15000                                                      T   3
890         RETURN                                                          T   4
891         END                                                             T   5-
892         SUBROUTINE STRCH (S,X,Y,Z)                                      U   1
893         CALL TOWIND (X,Y,Z)                                             U   2
894         X=S*X                                                           U   3
895         CALL TOBODY (X,Y,Z)                                             U   4
896         RETURN                                                          U   5
897         END                                                             U   6-
898         SUBROUTINE STREAM (A1,A2,A3,A4,X0,Y0,Z0,DS0,AN,AX,XN,XX,YN,YX,ZN,Z  V   1
899        1X,NX,JSTRM)                                                     V   2
900   C     DC TODD  8/11/71                                                V   3
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
      DIMENSION A1(1), A2(1), A3(1), A4(1)                                    V   4
      DIMENSION CODE(8)                                                       V   5
      DATA CODE/4HN>NX,4HX<XN,4HX>XX,4HY<YN,4HY>YX,4HZ<ZN,4HZ>ZX,4HD<DN/      V   6
      J=1000                                                                  V   7
      JPAGE=0                                                                 V   8
      L=1                                                                     V   9
      DSX=ABS(DS0)                                                            V  10
      DSN=.001*DSX                                                            V  11
      CX=COSD(AN)                                                             V  12
      CN=COSD(AX)                                                             V  13
      DS=DS0                                                                  V  14
      N=0                                                                     V  15
      X=X0                                                                    V  16
      Y=Y0                                                                    V  17
      Z=Z0                                                                    V  18
10    CALL VELOCY (A1,A2,A3,A4,X,Y,Z,U,V,W)                                   V  19
      CALL PAGE (1,J,50)                                                      V  20
      IF (J.GT.1) GO TO 20                                                    V  21
      JPAGE=JPAGE+1                                                           V  22
      WRITE (6,140) JSTRM,JPAGE,AN,AX,DS0                                     V  23
      CALL VELLAB                                                             V  24
20    CONTINUE                                                                V  25
      CALL VELOUT (X,Y,Z,U,V,W,3,22)                                          V  26
      IF (N.GE.NX) GO TO 120                                                  V  27
      IF (X.LE.XN) GO TO 110                                                  V  28
      IF (X.GE.XX) GO TO 100                                                  V  29
      IF (Y.LE.YN) GO TO 90                                                   V  30
      IF (Y.GE.YX) GO TO 80                                                   V  31
      IF (Z.LE.ZN) GO TO 70                                                   V  32
      IF (Z.GE.ZX) GO TO 60                                                   V  33
      T=SQRT(U*U+V*V+W*W)                                                     V  34
30    F=DS/T                                                                  V  35
      X1=X+F*U                                                                V  36
      Y1=Y+F*V                                                                V  37
      Z1=Z+F*W                                                                V  38
      CALL VELOCY (A1,A2,A3,A4,X1,Y1,Z1,U1,V1,W1)                             V  39
      T1=SQRT(U1*U1+V1*V1+W1*W1)                                              V  40
      C=(U*U1+V*V1+W*W1)/(T*T1)                                               V  41
      IF (C.GE.CN) GO TO 40                                                   V  42
      DS=.75*DS                                                               V  43
      IF (ABS(DS).LE.DSN) GO TO 50                                            V  44
      GO TO 30                                                                V  45
40    F=.5*DS                                                                 V  46
      X=X+F*(U/T+U1/T1)                                                       V  47
      Y=Y+F*(V/T+V1/T1)                                                       V  48
      Z=Z+F*(W/T+W1/T1)                                                       V  49
      N=N+1                                                                   V  50
      IF (C.GT.CX) DS=SIGN(AMIN1(DSX,1.5*ABS(DS)),DS)                         V  51
      GO TO 10                                                                V  52
50    L=L+1                                                                   V  53
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
  951  60    L=L+1                                                          V  54
  952  70    L=L+1                                                          V  55
  953  80    L=L+1                                                          V  56
  954  90    L=L+1                                                          V  57
  955  100   L=L+1                                                          V  58
  956  110   L=L+1                                                          V  59
  957  120   WRITE (6,130) CODE(L)                                          V  60
  958        RETURN                                                         V  61
  959  C                                                                    V  62
  960  130   FORMAT (8H0 ***** ,A4,6H *****)                                V  63
  961  140   FORMAT (11H STREAMLINE,I4,4X,4HPAGE,I4/5H AN =,F6.3,5X,4HAX =,F6.3  V  64
  962       1,5X,5HDS0 =,1PE12.4)                                          V  65
  963        END                                                            V  66-
  964        SUBROUTINE STRECH (X,Y,Z,CX,CY,CZ,BX,BY,BZ)                    W   1
  965        DIMENSION X(4,1), Y(4,1), Z(4,1), CX(1), CY(1), CZ(1), BX(1), BY(1  W   2
  966       1), BZ(1)                                                       W   3
  967        COMMON /FIXED/ NW                                              W   4
  968        COMMON /FLOAT/ DM1,AX,AY,AZ,DM,EM,DM2(11),BETA,RB              W   5
  969        IF (EM.EQ.0.) RETURN                                           W   6
  970        DO 20 K=1,NW                                                   W   7
  971        DO 10 J=1,4                                                    W   8
  972  10    CALL STRCH (RB,X(J,K),Y(J,K),Z(J,K))                           W   9
  973        IF (BX(K).EQ.1.E51) GO TO 20                                   W  10
  974        CALL STRCH (RB,CX(K),CY(K),CZ(K))                              W  11
  975        CALL STRCH (BETA,BX(K),BY(K),BZ(K))                            W  12
  976        CALL UNITYZ (BX(K),BY(K),BZ(K))                                W  13
  977  20    CONTINUE                                                       W  14
  978        CALL STRCH (RB,AX,AY,AZ)                                       W  15
  979        CALL UNITYZ (AX,AY,AZ)                                         W  16
  980        WRITE (6,30)                                                   W  17
  981        RETURN                                                         W  18
  982  C                                                                    W  19
  983  30    FORMAT (15H0BODY STRETCHED)                                    W  20
  984        END                                                            W  21-
  985        SUBROUTINE SYMTRY (PX,PY,PZ,VX,VY,VZ,G,X,Y,Z,L)                X   1
  986        DIMENSION X(1), Y(1), Z(1)                                     X   2
  987        COMMON /FIXED/ JDM,LX,LY,LZ                                    X   3
  988        VX=0.                                                          X   4
  989        VY=0.                                                          X   5
  990        VZ=0.                                                          X   6
  991        QX=PX                                                          X   7
  992        QY=PY                                                          X   8
  993        QZ=PZ                                                          X   9
  994        SX=1.                                                          X  10
  995        SY=1.                                                          X  11
  996        SZ=1.                                                          X  12
  997        DO 50 JZ=1,2                                                   X  13
  998        DO 30 JY=1,2                                                   X  14
  999        DO 10 JX=1,2                                                   X  15
 1000        CALL TYPE (QX,QY,QZ,UX,UY,UZ,G,X,Y,Z,L)                        X  16
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1001          VX=VX+SX*UX                                                      X  17
1002          VY=VY+SY*UY                                                      X  18
1003          VZ=VZ+SZ*UZ                                                      X  19
1004          IF (LX.EQ.0) GO TO 20                                            X  20
1005          QX=-QX                                                           X  21
1006    10    SX=-SX                                                           X  22
1007    20    IF (LY.EQ.0) GO TO 40                                            X  23
1008          QY=-QY                                                           X  24
1009    30    SY=-SY                                                           X  25
1010    40    IF (LZ.EQ.0) GO TO 60                                            X  26
1011          QZ=-QZ                                                           X  27
1012    50    SZ=-SZ                                                           X  28
1013    60    RETURN                                                           X  29
1014          END                                                              X  30-
1015          SUBROUTINE SYSIN (M,N,NDIM,JU1,JU2,MM2,N2,A)                     Y   1
1016          DIMENSION A(N,1)                                                 Y   2
1017          JU1=91                                                           Y   3
1018          JU2=92                                                           Y   4
1019          MM2=0                                                            Y   5
1020          N2=N                                                             Y   6
1021          MA=NDIM/(2*N)                                                    Y   7
1022          L=0                                                              Y   8
1023          KA=0                                                             Y   9
1024          DO 30 K=1,M                                                      Y  10
1025          KA=KA+1                                                          Y  11
1026          READ (90) (A(J,KA),J=1,N)                                        Y  12
1027          IF (K.LT.M) GO TO 10                                             Y  13
1028          L=1                                                              Y  14
1029          GO TO 20                                                         Y  15
1030    10    IF (KA.LT.MA) GO TO 30                                           Y  16
1031    20    CALL BLKOUT (JU2,N,N,KA,L,L,A)                                   Y  17
1032          MM2=MAXO(MM2,KA)                                                 Y  18
1033          KA=0                                                             Y  19
1034    30    CONTINUE                                                         Y  20
1035          REWIND 90                                                        Y  21
1036          RETURN                                                           Y  22
1037          END                                                              Y  23-
1038          SUBROUTINE SYSTEM (X,Y,Z,CX,CY,CZ,BX,BY,BZ,M)                    Z   1
1039          DIMENSION X(4,1), Y(4,1), Z(4,1), CX(1), CY(1), CZ(1), BX(1), BY(1  Z   2
1040         1), BZ(1), H(M)                                                   Z   3
1041          COMMON /ARRAYS/ ITR(1)                                           Z   4
1042          COMMON /FIXED/ N                                                 Z   5
1043          COMMON /FLOAT/ DM1(6),FS,FX,FY,FZ                                Z   6
1044          WRITE (6,60)                                                     Z   7
1045          DO 50 I=1,M                                                      Z   8
1046          EX=BX(I)                                                         Z   9
1047          EY=BY(I)                                                         Z  10
1048          IF (EX.NE.1.E51) GO TO 20                                        Z  11
1049          DO 10 J=1,M                                                      Z  12
1050    10    H(J)=0.                                                          Z  13
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
1051          H(I)=1.                                                                    Z  14
1052          AI=EY                                                                      Z  15
1053          GO TO 40                                                                   Z  16
1054    20    CONTINUE                                                                   Z  17
1055          EZ=BZ(I)                                                                   Z  18
1056          DO 30 J=1,M                                                                Z  19
1057          CALL SVMTRY (CX(I),CY(I),CZ(I),VX,VY,VZ,1,,X(1,J),Y(1,J),Z(1,J),IT        Z  20
1058         1R(J))                                                                      Z  21
1059    30    H(J)=VX*EX+VY*EY+VZ*EZ                                                     Z  22
1060          AI=-FS*(FX*EX+FY*EY+FZ*EZ)                                                 Z  23
1061    40    CONTINUE                                                                   Z  24
1062          WRITE (90) H,AI                                                            Z  25
1063    50    CONTINUE                                                                   Z  26
1064          END FILE 90                                                                Z  27
1065          REWIND 90                                                                  Z  28
1066          WRITE (6,70)                                                               Z  29
1067          RETURN                                                                     Z  30
1068    C                                                                                Z  31
1069    60    FORMAT (19HOSYSTEM STARTED)                                                Z  32
1070    70    FORMAT (16HOSYSTEM COMPUTED)                                               Z  33
1071          END                                                                        Z  34-
1072          SUBROUTINE TOBODY (X,Y,Z)                                                 AA   1
1073          COMMON /FLOAT/ DUM(7),FX,FY,FZ,GX,GY,GZ,HX,HY,HZ                          AA   2
1074          F=X*FX+Y*GX+Z*HX                                                          AA   3
1075          G=X*FY+Y*GY+Z*HY                                                          AA   4
1076          H=X*FZ+Y*GZ+Z*HZ                                                          AA   5
1077          GO TO 10                                                                  AA   6
1078          ENTRY TOWIND(X,Y,Z)                                                       AA   7
1079          F=FX*X+FY*Y+FZ*Z                                                          AA   8
1080          G=GX*X+GY*Y+GZ*Z                                                          AA   9
1081          H=HX*X+HY*Y+HZ*Z                                                          AA  10
1082    10    X=F                                                                       AA  11
1083          Y=G                                                                       AA  12
1084          Z=H                                                                       AA  13
1085          RETURN                                                                    AA  14
1086          END                                                                       AA  15-
1087          SUBROUTINE TYPE (PX,PY,PZ,VX,VY,VZ,G,X,Y,Z,L)                            AB   1
1088          DIMENSION X(1), Y(1), Z(1)                                                AB   2
1089          COMMON /FLOAT/ DM,AX,AY,AZ                                                AB   3
1090          IF (L.NE.1) GO TO 10                                                      AB   4
1091          CALL POINT (G,X(1),Y(1),Z(1),PX,PY,PZ,VX,VY,VZ)                           AB   5
1092          RETURN                                                                    AB   6
1093    10    CONTINUE                                                                  AB   7
1094          CALL SEGM (G,X(1),Y(1),Z(1),X(2),Y(2),Z(2),PX,PY,PZ,VX,VY,VZ)             AB   8
1095          CALL SEGM (G,X(2),Y(2),Z(2),X(3),Y(3),Z(3),PX,PY,PZ,UX,UY,UZ)             AB   9
1096          CALL SEGM (G,X(3),Y(3),Z(3),X(4),Y(4),Z(4),PX,PY,PZ,WX,WY,WZ)             AB  10
1097          VX=UX+VX+WX                                                               AB  11
1098          VY=UY+VY+WY                                                               AB  12
1099          VZ=UZ+VZ+WZ                                                               AB  13
1100          IF (L.NE.2) GO TO 20                                                      AB  14
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1101        CALL SEGN (G,X(4),Y(4),Z(4),X(1),Y(1),Z(1),PX,PY,PZ,WX,WY,WZ)      AB  15
1102        VX=VX+WX                                                           AB  16
1103        VY=VY+WY                                                           AB  17
1104        VZ=VZ+WZ                                                           AB  18
1105        RETURN                                                             AB  19
1106   20   CONTINUE                                                           AB  20
1107        CALL RAY (G,X(4),Y(4),Z(4),AX,AY,AZ,PX,PY,PZ,UX,UY,UZ)             AB  21
1108        CALL RAY (G,X(1),Y(1),Z(1),AX,AY,AZ,PX,PY,PZ,WX,WY,WZ)             AB  22
1109        VX=UX+VX-WX                                                        AB  23
1110        VY=UY+VY-WY                                                        AB  24
1111        VZ=UZ+VZ-WZ                                                        AB  25
1112        RETURN                                                             AB  26
1113        END                                                                AB  27-
1114        SUBROUTINE UNITYZ (X,Y,Z)                                          AC   1
1115        F=1./SQRT(X**2+Y**2+Z**2)                                          AC   2
1116        X=F*X                                                              AC   3
1117        Y=F*Y                                                              AC   4
1118        Z=F*Z                                                              AC   5
1119        RETURN                                                             AC   6
1120        END                                                                AC   7-
1121        SUBROUTINE USER (X,Y,Z,G)                                          AD   1
1122        DIMENSION X(1), Y(1), Z(1), G(18)                                  AD   2
1123        I=0                                                                AD   3
1124        KPAGE=0                                                            AD   4
1125   10   J=1000                                                             AD   5
1126   20   READ (12) X0,Y0,Z0,DS0,A1,A2,X1,X2,Y1,Y2,Z1,Z2,TN,A,B,C,D,E,L      AD   6
1127        IF (L.EQ.-999) GO TO 60                                            AD   7
1128        IF (L.NE.1) GO TO 40                                               AD   8
1129        CALL VELOCY (X,Y,Z,G,X0,Y0,Z0,U,V,W)                               AD   9
1130        CALL PAGE (1,J,50)                                                 AD  10
1131        IF (J.GT.1) GO TO 30                                               AD  11
1132        KPAGE=KPAGE+1                                                      AD  12
1133        WRITE (6,70) KPAGE                                                 AD  13
1134        CALL VELLAB                                                        AD  14
1135   30   CONTINUE                                                           AD  15
1136        CALL VELOUT (X0,Y0,Z0,U,V,W,L,22)                                  AD  16
1137        GO TO 20                                                           AD  17
1138   40   IF (L.NE.2) GO TO 20                                               AD  18
1139        WRITE (22) X0,Y0,Z0,DS0,A1,A2,X1,X2,Y1,Y2,Z1,Z2,TN,A,B,C,D,E,L     AD  19
1140        N2=TN                                                              AD  20
1141        IF (A1.LT.A2) GO TO 50                                             AD  21
1142        A1=1.                                                              AD  22
1143        A2=3.                                                              AD  23
1144   50   I=I+1                                                              AD  24
1145        CALL STREAM (X,Y,Z,G,X0,Y0,Z0,DS0,A1,A2,X1,X2,Y1,Y2,Z1,Z2,N2,I)    AD  25
1146        L=4                                                                AD  26
1147        WRITE (22) G,L                                                     AD  27
1148        GO TO 10                                                           AD  28
1149   60   WRITE (22) G,L                                                     AD  29
1150        END FILE 22                                                        AD  30
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
1151          REWIND 22                                                          AD  31
1152          RETURN                                                             AD  32
1153    C                                                                        AD  33
1154    70    FORMAT (19H VELOCITIES    PAGE,I4)                                 AD  34
1155          END                                                                AD  35-
1156          SUBROUTINE VELOCY (X,Y,Z,G,XB,YB,ZB,TU,TV,TW)                      AE   1
1157          DIMENSION X(4,1), Y(4,1), Z(4,1), G(1)                             AE   2
1158          COMMON /ARRAYS/ ITR(1)                                             AE   3
1159          COMMON /FIXED/ NW                                                  AE   4
1160          COMMON /FLOAT/ DM1(6),FS,DM2(11),RB,RBS                            AE   5
1161          XD=XB                                                              AE   6
1162          YD=YB                                                              AE   7
1163          ZD=ZB                                                              AE   8
1164          CALL STRCH (RB,XD,YD,ZD)                                           AE   9
1165          TU=0.                                                              AE  10
1166          TV=0.                                                              AE  11
1167          TW=0.                                                              AE  12
1168          DO 10 L=1,NW                                                       AE  13
1169          CALL SYNTRY (XD,YD,ZD,U,V,W,G(L),X(1,L),Y(1,L),Z(1,L),ITR(L))      AE  14
1170          TU=TU+U                                                            AE  15
1171          TV=TV+V                                                            AE  16
1172          TW=TW+W                                                            AE  17
1173    10    CONTINUE                                                           AE  18
1174          CALL TOWIND (TU,TV,TW)                                             AE  19
1175          TU=TU*RBS+FS                                                       AE  20
1176          TV=TV*RB                                                           AE  21
1177          TW=TW*RB                                                           AE  22
1178          CALL TOBODY (TU,TV,TW)                                             AE  23
1179          RETURN                                                             AE  24
1180          END                                                                AE  25-
1181          SUBROUTINE VELOUT (XD,YD,ZD,U,V,W,L,I)                             AF   1
1182          COMMON /FLOAT/ DM1(4),CA,EM,FS,DM2(9),EMS                          AF   2
1183          VS=U**2+V**2+W**2                                                  AF   3
1184          VA=SQRT(VS)                                                        AF   4
1185          R=VA                                                               AF   5
1186          IF (FS.NE.0.) R=VA/FS                                              AF   6
1187          CP=1.-R**2                                                         AF   7
1188          AM=1.+CA*EMS*CP                                                    AF   8
1189          IF (AM.LE.0.) GO TO 10                                             AF   9
1190          AM=EM*R/SQRT(AM)                                                   AF  10
1191    10    CONTINUE                                                           AF  11
1192          TV=ATAND(V,U)                                                      AF  12
1193          TW=ATAND(W,U)                                                      AF  13
1194          D=AM-EM                                                            AF  14
1195          WRITE (1) XD,YD,ZD,U,V,W,VA,AM,TV,TW,CP,D,A,A,A,A,A,A,L            AF  15
1196          WRITE (6,30) XD,YD,ZD,U,V,W,VA,AM,TV,TW,CP,D                       AF  16
1197          RETURN                                                             AF  17
1198          ENTRY VELLAB                                                       AF  18
1199          WRITE (6,20)                                                       AF  19
1200          RETURN                                                             AF  20
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
1201   C                                                                          AF  21
1202         20    FORMAT (1H ,T4,1HX,T16,1HY,T28,1HZ,T41,1HU,T51,1HV,T61,1HW,T70,3H|  AF  22
1203              1V|,T81,1HN,T90,6HA(V,U),T99,6HA(W,U),T108,2HCP,T119,4HM-MI)        AF  23
1204         30    FORMAT (1P3E12.4,0PF10.5,F8.2,F9.2,1PE12.3,E11.3)                  AF  24
1205               END                                                                AF  25-
1206               SUBROUTINE WIND                                                    AG   1
1207               COMMON /FLOAT/ DUM(7),FX,FY,FZ,GX,GY,GZ,HX,HY,HZ                   AG   2
1208               R=SQRT(FX**2+FY**2)                                                AG   3
1209               IF (R.GT..001) GO TO 10                                            AG   4
1210               FX=0.                                                              AG   5
1211               FY=0.                                                              AG   6
1212               FZ=SIGN(1.,FZ)                                                     AG   7
1213               GX=0.                                                              AG   8
1214               GY=1.                                                              AG   9
1215               GZ=0.                                                              AG  10
1216               HX=-FZ                                                             AG  11
1217               HY=0.                                                              AG  12
1218               HZ=0.                                                              AG  13
1219               RETURN                                                             AG  14
1220         10    GX=-FY/R                                                           AG  15
1221               GY=FX/R                                                            AG  16
1222               GZ=0.                                                              AG  17
1223               HX=-FZ*GY                                                          AG  18
1224               HY=FZ*GX                                                           AG  19
1225               HZ=R                                                               AG  20
1226               RETURN                                                             AG  21
1227               END                                                                AG  22-
1228               SUBROUTINE XOUT (JU,N,X)                                           AH   1
1229               DIMENSION X(N,1)                                                   AH   2
1230               L=0                                                                AH   3
1231         10    READ (JU) M,LB,LE,(X(1,L+K),K=1,M)                                 AH   4
1232               L=L+M                                                              AH   5
1233               IF (LB.EQ.0) GO TO 10                                              AH   6
1234               REWIND JU                                                          AH   7
1235               RETURN                                                             AH   8
1236               END                                                                AH   9-
1237   //GO.FT11F001 DD DSN=&&BODY,
1238   //     DISP=(OLD,PASS)                                                             97
1239   //GO.FT12F001 DD DSN=&&VELI,
1240   // DISP=(OLD,DELETE)
1241   //GO.FT90F001 DD UNIT=WORK,
1242   // SPACE=(CYL,(1,1),RLSE,,ROUND)
1243   //GO.FT91F001 DD UNIT=WORK,
1244   // SPACE=(CYL,(1,1),RLSE,,ROUND)
1245   //GO.FT92F001 DD UNIT=WORK,
1246   // SPACE=(CYL,(1,1),RLSE,,ROUND)
1247   //GO.FT22F001 DD DSN=&&VELY,
1248   //     UNIT=WORK,                                                          01090
1249   //     SPACE=(CYL,(1,1),RLSE,,ROUND),                                      01100
1250   //     DISP=(NEW,PASS)                                                     01120
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1251  //GO.FTOSF001 DD *
1252  QUICK TURN WITH STRUT #1      M=.5
1253  0.          90.         90.
1254  0.          90.         90.         1.0         .50
1255        0     1     0
1256  //      EXEC FTHLNKGO.                                                    38
1257  //      PLOTLIB=PLOT765                                                 04290
1258  C       POTENTIAL FLOW PLOT PROGRAM      DONALD C. TODD      JAN 3, 1975      A    2
1259        COMMON /ALPHA/ LABEL(18),ID1(9),ID2(9)                               A    3
1260        COMMON /ARRAYS/ C(42),P(400,21)                                      A    4
1261        COMMON /CVIEW/ LVIEW,LSCALE,LPOV                                     A    5
1262        COMMON /FIXED/ LPLOTR,INCHES,LBODY,LTROL,LVELY,LSTRM                 A    6
1263        COMMON /FLOAT/ AN,AT,AV,TX,TY,TZ,VMAX,RPD,BIG                        A    7
1264        DATA NDIM/400/                                                       A    8
1265        READ (5,40) LABEL                                                    A    9
1266        READ (5,50) AN,AT,AV,TX,TY,TZ,VMAX                                   A   10
1267        READ (5,60) LPLOTR,INCHES,LBODY,LTROL,LVELY,LSTRM                    A   11
1268        BIG=1.E50                                                            A   12
1269        RPD=.01745329                                                        A   13
1270        IF (AV.EQ.0.) LVELY=0                                                A   14
1271        IF (VMAX.LE.0.) VMAX=BIG                                             A   15
1272        IF (LPLOTR.EQ.835) INCHES=MIN0(INCHES,16)                            A   16
1273        IF (INCHES.EQ.0) INCHES=16                                           A   17
1274        CALL LABELS (ID1,36H                                )                A   18
1275        CALL LABELS (ID2,36HDC TODD  CCO                    )                A   19
1276        CALL DATE                                                            A   20
1277        WRITE (6,70)                                                         A   21
1278        WRITE (6,80) ID1,ID2                                                 A   22
1279        WRITE (6,80) LABEL                                                   A   23
1280        WRITE (6,110)                                                        A   24
1281        WRITE (6,90) AN,AT,AV,TX,TY,TZ,VMAX                                  A   25
1282        WRITE (6,120)                                                        A   26
1283        WRITE (6,100) LPLOTR,INCHES,LBODY,LTROL,LVELY,LSTRM                  A   27
1284        TX=COS(RPD*TX)                                                       A   28
1285        TY=COS(RPD*TY)                                                       A   29
1286        TZ=COS(RPD*TZ)                                                       A   30
1287        TE=1.-(TX**2+TY**2+TZ**2)                                            A   31
1288        TX=AT*TX                                                             A   32
1289        TY=AT*TY                                                             A   33
1290        TZ=AT*TZ                                                             A   34
1291        WRITE (6,130)                                                        A   35
1292        WRITE (6,90) TX,TY,TZ,TE                                             A   36
1293        CALL SETUP (P,P(1,19),P(1,20),P(1,21),NDIM)                          A   37
1294        CALL OPEN                                                            A   38
1295        DO 20 LV=1,100000                                                    A   39
1296        READ (5,60) LVIEW,LSCALE,LPOV                                        A   40
1297        IF (LVIEW.EQ.0) GO TO 30                                             A   41
1298        WRITE (6,140)                                                        A   42
1299        WRITE (6,100) LVIEW,LSCALE,LPOV                                      A   43
1300        CALL VIEWZ                                                           A   44
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1301          IF (LVIEW.GT.0) GO TO 10                                        A  45
1302          CALL CONTUR (P,P(1,2),NDIM,20*NDIM)                             A  46
1303          GO TO 20                                                        A  47
1304     10   CONTINUE                                                        A  48
1305          CALL CORNRS                                                     A  49
1306          CALL SKAL2 (INCHES)                                             A  50
1307          CALL START                                                      A  51
1308          CALL PLOD (P,P(1,19),P(1,20),P(1,21),NDIM)                      A  52
1309          CALL FINISH                                                     A  53
1310          WRITE (6,150)                                                   A  54
1311     20   CONTINUE                                                        A  55
1312     30   CALL CLOSE                                                      A  56
1313          WRITE (6,160)                                                   A  57
1314          STOP                                                            A  58
1315     C                                                                    A  59
1316     40   FORMAT (18A4)                                                   A  60
1317     50   FORMAT (7E10.0)                                                 A  61
1318     60   FORMAT (1415)                                                   A  62
1319     70   FORMAT (1H1)                                                    A  63
1320     80   FORMAT (1H ,18A4)                                               A  64
1321     90   FORMAT (1P10E12.4)                                              A  65
1322     100  FORMAT (12I10)                                                  A  66
1323     110  FORMAT (5H0  AN,10X,2HAT,10X,2HAV,10X,2HTX,10X,2HTY,10X,2HTZ,10X,4  A  67
1324         1HVMAX)                                                         A  68
1325     120  FORMAT (10H0   LPLOTR,4X,6HINCHES,5X,5HLBODY,5X,5HLTROL,5X,5HLVELY  A  69
1326         1,5X,5HLSTRM)                                                   A  70
1327     130  FORMAT (5H0  TX,10X,2HTY,10X,2HTZ,10X,2HTE)                     A  71
1328     140  FORMAT (10H0    LVIEW,4X,6HLSCALE,6X,4HLPOV)                    A  72
1329     150  FORMAT (15H0VIEW COMPLETED)                                     A  73
1330     160  FORMAT (19H0PLOTTING COMPLETED)                                 A  74
1331          END                                                             A  75-
1332          SUBROUTINE AMID (A,X,B)                                         B   1
1333          IF (A.GT.B) GO TO 40                                            B   2
1334          IF (X.GE.A) GO TO 20                                            B   3
1335     10   X=A                                                             B   4
1336          RETURN                                                          B   5
1337     20   IF (X.LE.B) RETURN                                              B   6
1338     30   X=B                                                             B   7
1339          RETURN                                                          B   8
1340     40   IF (X.LT.B) GO TO 30                                            B   9
1341          IF (X.GT.A) GO TO 10                                            B  10
1342          RETURN                                                          B  11
1343          END                                                             B  12-
1344          SUBROUTINE CONTRL (P,N,J,L,JSET)                                C   1
1345          DIMENSION P(3,6,1), N(1), J(1), L(1)                            C   2
1346          DIMENSION A1(3), A2(3), A3(3), NJ(2), LL(2)                     C   3
1347          COMMON /ARRAYS/ C(3,6)                                          C   4
1348          COMMON /FLOAT/ AN                                               C   5
1349          DATA NJ/2,1/,LL/4,8/                                            C   6
1350          IF (C(1,5).NE.1.E50) GO TO 20                                   C   7
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1351          DO 10 I=1,3                                                      C   8
1352          C(I,5)=.25*(C(I,1)+C(I,2)+C(I,3)+C(I,4))                         C   9
1353    10    P(I,1,JSET)=C(I,5)                                               C  10
1354    20    IF (C(1,6).NE.1.E50) GO TO 60                                    C  11
1355          DO 30 I=1,3                                                      C  12
1356          A1(I)=C(I,4)-C(I,2)                                              C  13
1357    30    A2(I)=C(I,3)-C(I,1)                                              C  14
1358          A3(1)=A1(2)*A2(3)-A1(3)*A2(2)                                    C  15
1359          A3(2)=A1(3)*A2(1)-A1(1)*A2(3)                                    C  16
1360          A3(3)=A1(1)*A2(2)-A1(2)*A2(1)                                    C  17
1361          F=SQRT(A3(1)**2+A3(2)**2+A3(3)**2)                               C  18
1362          IF (F.GT.0.) GO TO 40                                            C  19
1363          LZ=2                                                             C  20
1364          GO TO 80                                                         C  21
1365    40    LZ=1                                                             C  22
1366          F=1./F                                                           C  23
1367          DO 50 I=1,3                                                      C  24
1368    50    C(I,6)=F*A3(I)                                                   C  25
1369    60    DO 70 I=1,3                                                      C  26
1370    70    P(I,2,JSET)=C(I,5)+AN*C(I,6)                                     C  27
1371    80    N(JSET)=NJ(LZ)                                                   C  28
1372          J(JSET)=NJ(LZ)                                                   C  29
1373          L(JSET)=LL(LZ)                                                   C  30
1374          RETURN                                                           C  31
1375          END                                                              C  32-
1376          SUBROUTINE CONTUL (LX,LY,LC,IDC)                                 D   1
1377          DIMENSION ID1(3), ID2(3)                                         D   2
1378          COMMON /ALPHA/ LABEL(36),IDX(9),IDY(9)                           D   3
1379          DATA ID1/4H X  ,4H Y  ,4H Z  /                                   D   4
1380          DATA ID2/4HX = ,4HY = ,4HZ = /                                   D   5
1381          IDX(5)=ID1(LX)                                                   D   6
1382          IDY(5)=ID1(LY)                                                   D   7
1383          IF ((LX.NE.1).AND.(LY.NE.1)) LC=1                                D   8
1384          IF ((LX.NE.2).AND.(LY.NE.2)) LC=2                                D   9
1385          IF ((LX.NE.3).AND.(LY.NE.3)) LC=3                                D  10
1386          IDC=ID2(LC)                                                      D  11
1387          RETURN                                                           D  12
1388          END                                                              D  13-
1389          SUBROUTINE CONTUR (Z,A,NDZ,NDA)                                  E   1
1390          DIMENSION Z(1), A(1)                                             E   2
1391          COMMON /ARRAYS/ C(18)                                            E   3
1392          COMMON /FIXED/ LDUM,INCHES                                       E   4
1393          COMMON /FLOAT/ DUM(15),X1,X2,Y1,Y2                               E   5
1394          DATA F/1.4/                                                      E   6
1395          READ (5,120) LX,LY,LZ,NX,NY,NZ,NSKIP                             E   7
1396          IF (NZ.EQ.0) NZ=7                                                E   8
1397          NA=NX*NY                                                         E   9
1398          WRITE (6,150)                                                    E  10
1399          WRITE (6,130) LX,LY,LZ,NX,NY,NZ,NSKIP,NA                         E  11
1400          IF ((NA.LE.NDA).AND.(NZ.LE.NDZ)) GO TO 10                        E  12
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1401          WRITE (6,170)                                                  E  13
1402          RETURN                                                         E  14
1403    10    CONTINUE                                                       E  15
1404          CALL CONTUL (LX,LY,LC,IDC)                                     E  16
1405          IF (NSKIP.EQ.0) GO TO 30                                       E  17
1406          DO 20 J=1,NSKIP                                                E  18
1407    20    READ (12) C,L                                                  E  19
1408    30    CONTINUE                                                       E  20
1409          DO 60 J=1,NA                                                   E  21
1410          READ (12) C,L                                                  E  22
1411          IF (J.GT.1) GO TO 40                                           E  23
1412          CL=C(LC)                                                       E  24
1413          X1=C(LX)                                                       E  25
1414          Y1=C(LY)                                                       E  26
1415          GO TO 50                                                       E  27
1416    40    IF (J.LT.NA) GO TO 50                                          E  28
1417          X2=C(LX)                                                       E  29
1418          Y2=C(LY)                                                       E  30
1419    50    A(J)=C(LZ)                                                     E  31
1420    60    CONTINUE                                                       E  32
1421          REWIND 12                                                      E  33
1422          IF (X2.GE.X1) GO TO 70                                         E  34
1423          X1=-X1                                                         E  35
1424          X2=-X2                                                         E  36
1425    70    IF (Y2.GE.Y1) GO TO 80                                         E  37
1426          Y1=-Y1                                                         E  38
1427          Y2=-Y2                                                         E  39
1428    80    DX=(X2-X1)/(NX-1)                                              E  40
1429          DY=(Y2-Y1)/(NY-1)                                              E  41
1430          CALL VALUS (NA,A,NZ,Z,F)                                       E  42
1431          WRITE (6,160) NZ                                               E  43
1432          WRITE (6,140) (Z(J),J=1,NZ)                                    E  44
1433          IF (NZ.LE.NDZ) GO TO 90                                        E  45
1434          WRITE (6,170)                                                  E  46
1435          RETURN                                                         E  47
1436    90    CONTINUE                                                       E  48
1437          CALL SKAL2 (INCHES-2)                                          E  49
1438          CALL START                                                     E  50
1439          B1=9.5                                                         E  51
1440          B2=9.0                                                         E  52
1441          B3=8.5                                                         E  53
1442          H=.1                                                           E  54
1443          S=(6./7.)*H                                                    E  55
1444          STEP=1.8*H                                                     E  56
1445          A1=-.5-13.0*S                                                  E  57
1446          A2=-.5-9.00*S                                                  E  58
1447          AS=-.5-10.5*S                                                  E  59
1448          CALL SYMBOL (A1,B1,H,IDC,0.,4)                                 E  60
1449          CALL PLTFLT (A2,B1,H,CL,0.,3)                                  E  61
1450          ZL=LZ                                                          E  62
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1451          CALL SYMBOL (AS,B2,H,5HLZ = ,0.,5)                                E  63
1452          CALL NUMBER (-0.,-0.,-0.,ZL,0.,-1)                                E  64
1453          L=0                                                               E  65
1454          DO 100 J=1,NZ                                                     E  66
1455          B=Z(J)                                                            E  67
1456          CALL LEVEL (NX,NY,X1,Y1,DX,DY,A,B,L,N)                            E  68
1457          IF (N.EQ.0) GO TO 100                                             E  69
1458          BS=B3+.5*H                                                        E  70
1459          CALL SYMBOL (AS,BS,H,L,0.,-1)                                     E  71
1460          CALL PLTFLT (A2,B3,H,B,0.,3)                                      E  72
1461          L=L+1                                                             E  73
1462          B3=B3-STEP                                                        E  74
1463          IF (B3.LT.,5) GO TO 110                                           E  75
1464     100  CONTINUE                                                          E  76
1465          CALL FINISH                                                       E  77
1466          WRITE (6,180)                                                     E  78
1467          RETURN                                                            E  79
1468     110  CALL FINISH                                                       E  80
1469          WRITE (6,190)                                                     E  81
1470          RETURN                                                            E  82
1471     C                                                                      E  83
1472     120  FORMAT (1415)                                                     E  84
1473     130  FORMAT (12I10)                                                    E  85
1474     140  FORMAT (1P10E12.4)                                                E  86
1475     150  FORMAT (1H0,7X,2HLX,8X,2HLY,8X,2HLZ,8X,2HNX,8X,2HNY,8X,2HNZ,5X,5HN  E  87
1476         1SKIP,8X,2HNA)                                                    E  88
1477     160  FORMAT (15H0Z VALUES  NZ =,I3)                                    E  89
1478     170  FORMAT (34HOUNDER DIMENSIONED.  VIEW ABORTED.)                    E  90
1479     180  FORMAT (15HOVIEW COMPLETED)                                       E  91
1480     190  FORMAT (19HOVIEW NOT COMPLETED)                                   E  92
1481          END                                                               E  93-
1482          SUBROUTINE CORNRS                                                 F   1
1483          COMMON /ARRAYS/ X(9),Y(9),Q(24)                                   F   2
1484          COMMON /FLOAT/ DM1(8),BIG,DM2(6),X1,X2,Y1,Y2                      F   3
1485          X1=BIG                                                            F   4
1486          Y1=BIG                                                            F   5
1487          X2=-BIG                                                           F   6
1488          Y2=-BIG                                                           F   7
1489          CALL VIEW (8,Q,X,Y)                                               F   8
1490          DO 10 K=1,8                                                       F   9
1491          X1=AMIN1(X1,X(K))                                                 F  10
1492          Y1=AMIN1(Y1,Y(K))                                                 F  11
1493          X2=AMAX1(X2,X(K))                                                 F  12
1494          Y2=AMAX1(Y2,Y(K))                                                 F  13
1495     10   CONTINUE                                                          F  14
1496          WRITE (6,20)                                                      F  15
1497          WRITE (6,30) X1,Y1,X2,Y2                                          F  16
1498          RETURN                                                            F  17
1499     C                                                                      F  18
1500     20   FORMAT (5H0  X1,10X,2HY1,10X,2HX2,10X,2HY2)                       F  19
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
1501   30     FORMAT (1P10E12.4)                                                      F  20
1502          END                                                                     F  21-
1503          SUBROUTINE DATE                                                         G   1
1504          DIMENSION KW(7), MN(12), NM(12)                                         G   2
1505          COMMON /ALPHA/ LAB(18),JOB(3),KAL(6)                                    G   3
1506          DATA KW/4HSUN ,4HMON ,4HTUE ,4HWED ,4HTHU ,4HFRI ,4HSAT /               G   4
1507          DATA MN/4HJAN ,4HFEB ,4HMAR ,4HAPR ,4HMAY ,4HJUN ,4HJUL ,4HAUG ,4H      G   5
1508         1SEP ,4HOCT ,4HNOV ,4HDEC /                                              G   6
1509          DATA NM/31,28,31,30,31,30,31,31,30,31,30,31/                            G   7
1510          CALL GETWHO (JOB,JYD)                                                   G   8
1511          JY=JYD/1000                                                             G   9
1512          JD=JYD-1000*JY                                                          G  10
1513          JY=JY+1900                                                              G  11
1514          N=JY+10000                                                              G  12
1515          JW=N+(N+3)/4-(N+99)/100+(N+399)/400+JD-1                                G  13
1516          JW=JW-7*((JW-1)/7)                                                      G  14
1517          IF (N.NE.4*(N/4)) GO TO 20                                              G  15
1518          IF (N.NE.100*(N/100)) GO TO 10                                          G  16
1519          IF (N.NE.400*(N/400)) GO TO 20                                          G  17
1520   10     NM(2)=29                                                                G  18
1521          GO TO 30                                                                G  19
1522   20     NM(2)=28                                                                G  20
1523   30     CONTINUE                                                                G  21
1524          DO 40 JM=1,12                                                           G  22
1525          IF (JD.LE.NM(JM)) GO TO 50                                              G  23
1526   40     JD=JD-NM(JM)                                                            G  24
1527   50     CONTINUE                                                                G  25
1528          J2=JD/10                                                                G  26
1529          J1=JD-10*J2+240                                                         G  27
1530          J2=J2+240                                                               G  28
1531          K4=JY/1000                                                              G  29
1532          JY=JY-1000*K4                                                           G  30
1533          K4=K4+240                                                               G  31
1534          K3=JY/100                                                               G  32
1535          JY=JY-100*K3                                                            G  33
1536          K3=K3+240                                                               G  34
1537          K2=JY/10                                                                G  35
1538          K1=JY-10*K2+240                                                         G  36
1539          K2=K2+240                                                               G  37
1540          KAL(1)=KW(JW)                                                           G  38
1541          KAL(2)=MN(JM)                                                           G  39
1542          KAL(3)=64+256*(107+256*(J1+256*J2))                                     G  40
1543          KAL(4)=K1+256*(K2+256*(K3+256*K4))                                      G  41
1544          RETURN                                                                  G  42
1545          END                                                                     G  43-
1546          SUBROUTINE FILNID (LSE)                                                 H   1
1547          DIMENSION LSE(2)                                                        H   2
1548          COMMON /ALPHA/ LABEL(18),JOB(3),KAL(6),ID2(9)                           H   3
1549          CALL SYMBOL (0,,8,,1,,LSE,0,,5)                                         H   4
1550          CALL SYMBOL (0,,6,,1,,JOB,0,,8)                                         H   5
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
1551          CALL SYMBOL (0..4..1..KAL,0..16)                                        H   6
1552          CALL SYMBOL (0..2..1..ID2,0..18)                                        H   7
1553          RETURN                                                                  H   8
1554          ENTRY UNCLAS                                                            H   9
1555          CALL CALCMP (0..0..0.2)                                                 H  10
1556          CALL SYMBOL (0..9..1.5,12HUNCLASSIFIED,-30..12)                         H  11
1557          RETURN                                                                  H  12
1558          END                                                                     H  13-
1559          SUBROUTINE LABELS (L,N)                                                 I   1
1560          DIMENSION L(1), N(1)                                                    I   2
1561          DO 10 J=1,9                                                             I   3
1562    10    L(J)=N(J)                                                               I   4
1563          RETURN                                                                  I   5
1564          END                                                                     I   6-
1565          SUBROUTINE LEVEL (NX,NY,XN,YN,DX,DY,A,V,L,N)                            J   1
1566          DIMENSION A(NX,NY), X(4), Y(4)                                          J   2
1567          MX=NX-1                                                                 J   3
1568          MY=NY-1                                                                 J   4
1569          N=0                                                                     J   5
1570          DO 130 K=1,MY                                                           J   6
1571          Y1=YN+(K-1)*DY                                                          J   7
1572          DO 130 J=1,MX                                                           J   8
1573          X1=XN+(J-1)*DX                                                          J   9
1574          M=0                                                                     J  10
1575          V1=A(J,K)                                                               J  11
1576          V2=A(J+1,K)                                                             J  12
1577          V3=A(J+1,K+1)                                                           J  13
1578          V4=A(J,K+1)                                                             J  14
1579          D1=V-V1                                                                 J  15
1580          D2=V-V2                                                                 J  16
1581          D3=V-V3                                                                 J  17
1582          D4=V-V4                                                                 J  18
1583          IF (D1.EQ.0.) GO TO 50                                                  J  19
1584          IF (D1*D2.LT.0.) GO TO 60                                               J  20
1585    10    IF (D2.EQ.0.) GO TO 70                                                  J  21
1586          IF (D2*D3.LT.0.) GO TO 80                                               J  22
1587    20    IF (D3.EQ.0.) GO TO 90                                                  J  23
1588          IF (D3*D4.LT.0.) GO TO 100                                              J  24
1589    30    IF (D4.EQ.0.) GO TO 110                                                 J  25
1590          IF (D4*D1.LT.0.) GO TO 120                                              J  26
1591    40    IF (M.NE.2) GO TO 130                                                   J  27
1592          N=N+M                                                                   J  28
1593          CALL LINC (X,Y,M,1,1,L)                                                 J  29
1594          GO TO 130                                                               J  30
1595    50    M=M+1                                                                   J  31
1596          X(M)=X1                                                                 J  32
1597          Y(M)=Y1                                                                 J  33
1598          GO TO 10                                                                J  34
1599    60    M=M+1                                                                   J  35
1600          X(M)=X1+DX*D1/(V2-V1)                                                   J  36
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1601          Y(M)=Y1                                                          J  37
1602          GO TO 10                                                         J  38
1603    70    M=M+1                                                            J  39
1604          X(M)=X1+DX                                                       J  40
1605          Y(M)=Y1                                                          J  41
1606          GO TO 20                                                         J  42
1607    80    M=M+1                                                            J  43
1608          X(M)=X1+DX                                                       J  44
1609          Y(M)=Y1+DY*D2/(V3-V2)                                            J  45
1610          GO TO 20                                                         J  46
1611    90    M=M+1                                                            J  47
1612          X(M)=X1+DX                                                       J  48
1613          Y(M)=Y1+DY                                                       J  49
1614          GO TO 30                                                         J  50
1615    100   M=M+1                                                            J  51
1616          X(M)=X1+DX-DX*D3/(V4-V3)                                         J  52
1617          Y(M)=Y1+DY                                                       J  53
1618          GO TO 30                                                         J  54
1619    110   M=M+1                                                            J  55
1620          X(M)=X1                                                          J  56
1621          Y(M)=Y1+DY                                                       J  57
1622          GO TO 40                                                         J  58
1623    120   M=M+1                                                            J  59
1624          X(M)=X1                                                          J  60
1625          Y(M)=Y1+DY-DY*D4/(V1-V4)                                         J  61
1626          GO TO 40                                                         J  62
1627    130   CONTINUE                                                         J  63
1628          RETURN                                                           J  64
1629          END                                                              J  65-
1630          SUBROUTINE LINC (X,Y,N,K,J,L)                                    K   1
1631          DIMENSION X(1), Y(1)                                             K   2
1632          COMMON /FLOAT/ DUM(19),XO,YO,DX,DY,XF,YF                         K   3
1633          DATA CT/.9659258/,ST/.2588190/,DA/.110/                          K   4
1634          IF (L.NE.69) GO TO 20                                            K   5
1635          U=X(2)-X(1)                                                      K   6
1636          V=Y(2)-Y(1)                                                      K   7
1637          T=U**2+V**2                                                      K   8
1638          IF (T.GT.0.) GO TO 10                                            K   9
1639          N=1                                                              K  10
1640          J=1                                                              K  11
1641          L=1                                                              K  12
1642          GO TO 20                                                         K  13
1643    10    T=DA/SQRT(T)                                                     K  14
1644          TX=T*ABS(DX)                                                     K  15
1645          TY=T*ABS(DY)                                                     K  16
1646          X(3)=X(2)-TX*(U*CT+V*ST)                                         K  17
1647          X(4)=X(2)-TX*(U*CT-V*ST)                                         K  18
1648          X(5)=X(2)                                                        K  19
1649          Y(3)=Y(2)+TY*(U*ST-V*CT)                                         K  20
1650          Y(4)=Y(2)-TY*(U*ST+V*CT)                                         K  21
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1651          Y(5)=Y(2)                                                      K  22
1652          N=5                                                            K  23
1653     20   N1=N+1                                                         K  24
1654          N2=N+2                                                         K  25
1655          X(N1)=XO                                                       K  26
1656          X(N2)=DX                                                       K  27
1657          Y(N1)=YO                                                       K  28
1658          Y(N2)=DY                                                       K  29
1659          DO 30 I=1,N                                                    K  30
1660          CALL AMID (XO,X(I),XF)                                         K  31
1661          CALL AMID (YO,Y(I),YF)                                         K  32
1662     30   CONTINUE                                                       K  33
1663          CALL LINE (X,Y,N,K,J,L)                                        K  34
1664          RETURN                                                         K  35
1665          END                                                            K  36-
1666          SUBROUTINE LOOP (P,N,J,L,JSET)                                 L   1
1667          DIMENSION P(18,1), N(1), J(1), L(1)                            L   2
1668          COMMON /ARRAYS/ C(18)                                          L   3
1669          DO 10 I=1,12                                                   L   4
1670     10   P(I,JSET)=C(I)                                                 L   5
1671          DO 20 I=1,3                                                    L   6
1672     20   P(12+I,JSET)=C(I)                                              L   7
1673          N(JSET)=5                                                      L   8
1674          J(JSET)=0                                                      L   9
1675          L(JSET)=0                                                      L  10
1676          RETURN                                                         L  11
1677          END                                                            L  12-
1678          SUBROUTINE NEXT (P,N,J,L,JSET,NDIM)                            M   1
1679          DIMENSION P(3,6,NDIM), N(NDIM), J(NDIM), L(NDIM)               M   2
1680          COMMON /ARRAYS/ C(18),Q(3,8)                                   M   3
1681          COMMON /FLOAT/ DUM(9),X1,X2,Y1,Y2,Z1,Z2                        M   4
1682          IF (JSET.EQ.NDIM) GO TO 10                                     M   5
1683          IF (N(JSET).EQ.0) GO TO 10                                     M   6
1684          JSET=JSET+1                                                    M   7
1685          RETURN                                                         M   8
1686     10   DO 20 JS=1,NDIM                                                M   9
1687          NJ=N(JS)                                                       M  10
1688          IF (NJ.EQ.0) GO TO 30                                          M  11
1689          DO 20 K=1,NJ                                                   M  12
1690          X1=AMIN1(X1,P(1,K,JS))                                         M  13
1691          Y1=AMIN1(Y1,P(2,K,JS))                                         M  14
1692          Z1=AMIN1(Z1,P(3,K,JS))                                         M  15
1693          X2=AMAX1(X2,P(1,K,JS))                                         M  16
1694          Y2=AMAX1(Y2,P(2,K,JS))                                         M  17
1695     20   Z2=AMAX1(Z2,P(3,K,JS))                                         M  18
1696     30   WRITE (20) P,N,J,L                                             M  19
1697          IF (NJ.EQ.0) GO TO 40                                          M  20
1698          JSET=1                                                         M  21
1699          RETURN                                                         M  22
1700     40   END FILE 20                                                    M  23
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
1701          REWIND 20                                                          N   24
1702          Q(1,1)=X1                                                          N   25
1703          Q(1,2)=X1                                                          N   26
1704          Q(1,3)=X1                                                          N   27
1705          Q(1,4)=X1                                                          N   28
1706          Q(1,5)=X2                                                          N   29
1707          Q(1,6)=X2                                                          N   30
1708          Q(1,7)=X2                                                          N   31
1709          Q(1,8)=X2                                                          N   32
1710          Q(2,1)=Y1                                                          N   33
1711          Q(2,2)=Y1                                                          N   34
1712          Q(2,3)=Y2                                                          N   35
1713          Q(2,4)=Y2                                                          N   36
1714          Q(2,5)=Y1                                                          N   37
1715          Q(2,6)=Y1                                                          N   38
1716          Q(2,7)=Y2                                                          N   39
1717          Q(2,8)=Y2                                                          N   40
1718          Q(3,1)=Z1                                                          N   41
1719          Q(3,2)=Z2                                                          N   42
1720          Q(3,3)=Z1                                                          N   43
1721          Q(3,4)=Z2                                                          N   44
1722          Q(3,5)=Z1                                                          N   45
1723          Q(3,6)=Z2                                                          N   46
1724          Q(3,7)=Z1                                                          N   47
1725          Q(3,8)=Z2                                                          N   48
1726          WRITE (6,50)                                                       N   49
1727          WRITE (6,60) X1,X2,Y1,Y2,Z1,Z2                                     N   50
1728          RETURN                                                             N   51
1729     C                                                                       N   52
1730     50   FORMAT (5H0  X1,10X,2HX2,10X,2HY1,10X,2HY2,10X,2HZ1,10X,2HZ2)      N   53
1731     60   FORMAT (1P10E12.4)                                                 N   54
1732          END                                                                N   55-
1733          SUBROUTINE OPEN                                                    N    1
1734          DIMENSION BUFF(2000)                                               N    2
1735          COMMON /FIXED/ LPLOTR                                              N    3
1736          COMMON /FLOAT/ DUM(25),W                                           N    4
1737          NUFF=6000                                                          N    5
1738          IF (LPLOTR.NE.765) GO TO 10                                        N    6
1739          CALL PLOTS (BUFF,NUFF)                                             N    7
1740          RETURN                                                             N    8
1741     10   IF (LPLOTR.NE.635) GO TO 20                                        N    9
1742          CALL CALCMP (BUFF,NUFF,LTAPE,0)                                    N   10
1743          CALL CALCMP (.5,.5,0.3)                                            N   11
1744          CALL CALCMP (IAUXA,IAUXB,30.7)                                     N   12
1745          CALL FILMID (8HSTART   )                                           N   13
1746          CALL UNCLAS                                                        N   14
1747          CALL CALCMP (IAUXA,IAUXB,16.7)                                     N   15
1748          RETURN                                                             N   16
1749     20   CONTINUE                                                           N   17
1750          RETURN                                                             N   18
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
1751          ENTRY CLOSE                                                          N  19
1752          IF (LPLOTR.NE.765) GO TO 30                                          N  20
1753          CALL PLOT (0.,0.,999)                                                N  21
1754          RETURN                                                               N  22
1755    30    IF (LPLOTR.NE.835) GO TO 40                                          N  23
1756          CALL CALCMP (.5,.5,0.3)                                              N  24
1757          CALL CALCMP (IAUXA.IAUX8.30.7)                                       N  25
1758          CALL UNCLAS                                                          N  26
1759          CALL CALCMP (0.,0.,0.2)                                              N  27
1760          CALL FILMID (8HEND     )                                             N  28
1761          CALL CALCMP (0.,0.,9999,2)                                           N  29
1762          RETURN                                                               N  30
1763    40    CONTINUE                                                             N  31
1764          RETURN                                                               N  32
1765          END                                                                  N  33-
1766          SUBROUTINE PLOD (P,N,J,L,NDIM)                                       O   1
1767          DIMENSION P(3,6,NDIM), N(NDIM), J(NDIM), L(NDIM)                     O   2
1768          COMMON /ARRAYS/ X(9),Y(9)                                            O   3
1769          DO 10 JR=1,100000                                                    O   4
1770          READ (20) P,N,J,L                                                    O   5
1771          DO 10 JS=1,NDIM                                                      O   6
1772          NJ=N(JS)                                                             O   7
1773          IF (NJ.LE.0) GO TO 20                                                O   8
1774          CALL VIEW (NJ,P(1,1,JS),X,Y)                                         O   9
1775    10    CALL LINC (X,Y,NJ,1,J(JS),L(JS))                                     O  10
1776    20    REWIND 20                                                            O  11
1777          RETURN                                                               O  12
1778          END                                                                  O  13-
1779          SUBROUTINE SETUP (P,N,J,L,NDIM)                                      P   1
1780          DIMENSION P(1), N(1), J(1), L(1)                                     P   2
1781          COMMON /ARRAYS/ C(18)                                                P   3
1782          COMMON /FIXED/ LPLOTR,INCHES,LBODY,LTROL,LVELY,LSTRM                 P   4
1783          COMMON /FLOAT/ DUM(6),VMAX,RPD,BIG,X1,X2,Y1,Y2,Z1,Z2                 P   5
1784          X1=BIG                                                               P   6
1785          X2=-BIG                                                              P   7
1786          Y1=BIG                                                               P   8
1787          Y2=-BIG                                                              P   9
1788          Z1=BIG                                                               P  10
1789          Z2=-BIG                                                              P  11
1790          JSET=1                                                               P  12
1791          IF (LBODY.EQ.0.AND.LTROL.EQ.0) GO TO 80                              P  13
1792          NW=0                                                                 P  14
1793          DO 60 JR=1,100000                                                    P  15
1794          READ (11) C,LT                                                       P  16
1795          IF (LT.EQ.-999) GO TO 70                                             P  17
1796          NW=NW+1                                                              P  18
1797          BX=C(16)                                                             P  19
1798          IF (LBODY.EQ.0) GO TO 50                                             P  20
1799          IF (LT.NE.3) GO TO 10                                                P  21
1800          CALL SHOE (P,N,J,L,JSET)                                             P  22
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1801          GO TO 40                                                        P  23
1802    10    IF (LT.NE.2) GO TO 20                                           P  24
1803          CALL LOOP (P,N,J,L,JSET)                                        P  25
1804          GO TO 40                                                        P  26
1805    20    IF (LT.NE.1) GO TO 30                                           P  27
1806          CALL SOURCE (P,N,J,L,JSET)                                      P  28
1807          GO TO 40                                                        P  29
1808    30    CONTINUE                                                        P  30
1809          GO TO 50                                                        P  31
1810    40    CALL NEXT (P,N,J,L,JSET,NDIM)                                   P  32
1811    50    IF (LTROL.EQ.0) GO TO 60                                        P  33
1812          IF (BX.EQ.1.ES1) GO TO 60                                       P  34
1813          CALL CONTRL (P,N,J,L,JSET)                                      P  35
1814          CALL NEXT (P,N,J,L,JSET,NDIM)                                   P  36
1815    60    CONTINUE                                                        P  37
1816    70    REWIND 11                                                       P  38
1817          WRITE (6,140) NW                                                P  39
1818    80    IF (LVELY.EQ.0.AND.LSTRM.EQ.0) GO TO 130                        P  40
1819          DO 110 JR=1,100000                                              P  41
1820          READ (12) C,LT                                                  P  42
1821          IF (LT.EQ.-999) GO TO 120                                       P  43
1822          IF (LT.NE.1) GO TO 90                                           P  44
1823          IF (LVELY.EQ.0) GO TO 90                                        P  45
1824          IF (C(7).GE.VMAX) GO TO 90                                      P  46
1825          CALL VELY (P,N,J,L,JSET)                                        P  47
1826          CALL NEXT (P,N,J,L,JSET,NDIM)                                   P  48
1827          GO TO 110                                                       P  49
1828    90    IF (LT.NE.2) GO TO 100                                          P  50
1829          IF (LSTRM.EQ.0) GO TO 100                                       P  51
1830          CALL STRM (P,N,J,L,JSET,NDIM)                                   P  52
1831          GO TO 110                                                       P  53
1832    100   CONTINUE                                                        P  54
1833    110   CONTINUE                                                        P  55
1834    120   REWIND 12                                                       P  56
1835    130   N(JSET)=0                                                       P  57
1836          CALL NEXT (P,N,J,L,JSET,NDIM)                                   P  58
1837          RETURN                                                          P  59
1838    C                                                                     P  60
1839    140   FORMAT (5HONW =,I6)                                             P  61
1840          END                                                             P  62-
1841          SUBROUTINE SHOE (P,N,J,L,JSET)                                  Q   1
1842          DIMENSION P(18,1), N(1), J(1), L(1)                             Q   2
1843          COMMON /ARRAYS/ C(18)                                           Q   3
1844          COMMON /FLOAT/ DUM(3),T(3)                                      Q   4
1845          DO 10 I=1,12                                                    Q   5
1846    10    P(3+I,JSET)=C(I)                                                Q   6
1847          DO 20 I=1,3                                                     Q   7
1848          P(I,JSET)=C(I)+T(I)                                             Q   8
1849    20    P(15+I,JSET)=C(9+I)+T(I)                                        Q   9
1850          N(JSET)=6                                                       Q  10
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
                1         2         3         4         5         6         7         8
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
1851          J(JSET)=0                                                          Q  11
1852          L(JSET)=0                                                          Q  12
1853          RETURN                                                             Q  13
1854          END                                                                Q  14-
1855          SUBROUTINE SKALE (X1,X2,I,J,M,N)                                   R   1
1856    C          DC TODD  6/9/71                                               R   2
1857          XN=X1                                                              R   3
1858          XM=X2                                                              R   4
1859          IA=I                                                               R   5
1860          DX=(XM-XN)/IA                                                      R   6
1861          E=.001*AMAX1(ABS(XM),ABS(XN))                                      R   7
1862          IF (DX.GT.E) GO TO 10                                              R   8
1863          DX=E                                                               R   9
1864          IF (DX.EQ.0.) DX=1.                                                R  10
1865          B=XM+XN                                                            R  11
1866          E=IA*DX                                                            R  12
1867          XM=.5*(B+E)                                                        R  13
1868          XN=.5*(B-E)                                                        R  14
1869    10    E=ALOG10(DX)                                                       R  15
1870          J=E                                                                R  16
1871          IF (J.GT.E) J=J-1                                                  R  17
1872          B=10.**(E-J)                                                       R  18
1873          IF (B.GT.1.41) GO TO 20                                            R  19
1874          M=1                                                                R  20
1875          GO TO 50                                                           R  21
1876    20    IF (B.GT.3.16) GO TO 30                                            R  22
1877          M=2                                                                R  23
1878          GO TO 50                                                           R  24
1879    30    IF (B.GT.7.08) GO TO 40                                            R  25
1880          M=5                                                                R  26
1881          GO TO 50                                                           R  27
1882    40    M=1                                                                R  28
1883          J=J+1                                                              R  29
1884    50    DX=M*10.**J                                                        R  30
1885          N=XN/DX                                                            R  31
1886    60    B=N*DX                                                             R  32
1887          IF (B.LE.XN) GO TO 70                                              R  33
1888          N=N-1                                                              R  34
1889          GO TO 60                                                           R  35
1890    70    I=(XM-B)/DX                                                        R  36
1891    80    E=B+I*DX                                                           R  37
1892          IF (E.GE.XM) GO TO 90                                              R  38
1893          I=I+1                                                              R  39
1894          GO TO 80                                                           R  40
1895    90    CONTINUE                                                           R  41
1896          RETURN                                                             R  42
1897          END                                                                R  43-
1898          SUBROUTINE SKAL2 (INCHES)                                          S   1
1899          DIMENSION KDA(3)                                                   S   2
1900          COMMON /CVIEW/ LDUMMY,LSCALE                                       S   3
       12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1901          COMMON /FLOAT/ DUM(15),X1,X2,Y1,Y2,XO,YO,DX,DY,XF,YF,WX                $   4
1902          DATA KDA/1,2,5/                                                        $   5
1903          WY=10.                                                                 $   6
1904          IF (LSCALE.EQ.0) GO TO 10                                              $   7
1905          READ (5,80) XO,YO,DX,DY,WX                                             $   8
1906          GO TO 70                                                               $   9
1907    10    WX=INCHES                                                              $  10
1908          DX=(X2-X1)/WX                                                          $  11
1909          DY=(Y2-Y1)/WY                                                          $  12
1910          STEP=AMAX1(DX,DY)                                                      $  13
1911          IF (STEP.LE.0.) STEP=.5*(X1+Y1)                                        $  14
1912          IF (STEP.LE.0.) STEP=1.                                                $  15
1913          E=ALOG10(STEP)                                                         $  16
1914          JE=E                                                                   $  17
1915          IF (E.LT.0.) JE=JE-1                                                   $  18
1916          DO 30 J=1,10                                                           $  19
1917          E=10.**JE                                                              $  20
1918          DO 20 K=1,3                                                            $  21
1919          KO=KDA(K)                                                              $  22
1920          STEP=KO*E                                                              $  23
1921          SO=X1/STEP                                                             $  24
1922          JO=SO                                                                  $  25
1923          IF (SO.LT.0.) JO=JO-1                                                  $  26
1924          DO=SO-JO                                                               $  27
1925          IF (DO.GE..99) JO=JO+1                                                 $  28
1926          XO=JO*STEP                                                             $  29
1927          SO=Y1/STEP                                                             $  30
1928          JO=SO                                                                  $  31
1929          IF (SO.LT.0.) JO=JO-1                                                  $  32
1930          DO=SO-JO                                                               $  33
1931          IF (DO.GE..99) JO=JO+1                                                 $  34
1932          YO=JO*STEP                                                             $  35
1933          V=XO+(WX+.01)*STEP                                                     $  36
1934          IF (V.LT.X2) GO TO 20                                                  $  37
1935          V=YO+(WY+.01)*STEP                                                     $  38
1936          IF (V.LT.Y2) GO TO 20                                                  $  39
1937          GO TO 40                                                               $  40
1938    20    CONTINUE                                                               $  41
1939    30    JE=JE+1                                                                $  42
1940    40    DO 50 J=1,INCHES                                                       $  43
1941          WX=WX-1.                                                               $  44
1942          V=XO+(WX+.01)*STEP                                                     $  45
1943          IF (V.LT.X2) GO TO 60                                                  $  46
1944          IF (WX.LT.5.0) GO TO 60                                                $  47
1945    50    CONTINUE                                                               $  48
1946    60    WX=WX+1.                                                               $  49
1947          DX=STEP                                                                $  50
1948          DY=STEP                                                                $  51
1949    70    XF=XO+WX*DX                                                            $  52
1950          YF=YO+WY*DY                                                            $  53
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1951          WRITE (6,90)                                                    S  54
1952          WRITE (6,100) XO,YO,DX,DY,WX                                    S  55
1953          RETURN                                                          S  56
1954    C                                                                     S  57
1955    80    FORMAT (7E10.0)                                                 S  58
1956    90    FORMAT (5H0  XO,10X,2HYO,10X,2HDX,10X,2HDY,10X,2HWX)            S  59
1957    100   FORMAT (1P10E12.4)                                              S  60
1958          END                                                             S  61-
1959          SUBROUTINE SOURCE (P,N,J,L,JSET)                                T   1
1960          DIMENSION P(18,1), N(1), J(1), L(1)                             T   2
1961          COMMON /ARRAYS/ C(18)                                           T   3
1962          DO 10 I=1,3                                                     T   4
1963    10    P(I,JSET)=C(I+3)                                                T   5
1964          N(JSET)=1                                                       T   6
1965          J(JSET)=1                                                       T   7
1966          L(JSET)=11                                                      T   8
1967          RETURN                                                          T   9
1968          END                                                             T  10-
1969          SUBROUTINE START                                                U   1
1970          COMMON /ALPHA/ LAB(18),IDS(18),IDX(9),IDY(9)                    U   2
1971          COMMON /CVIEW/ LVIEW                                            U   3
1972          COMMON /FIXED/ LPLOTR                                           U   4
1973          COMMON /FLOAT/ DUM(19),XO,YO,DX,DY,XF,YF,W                      U   5
1974          IF (LPLOTR.NE.765) GO TO 10                                     U   6
1975          CALL PLOT (0.,-12.0,3)                                          U   7
1976          CALL PLOT (0.,-11.5,-3)                                         U   8
1977          IF (LVIEW.LT.0) CALL PLOT (1.5,0.,23)                           U   9
1978          GO TO 20                                                        U  10
1979    10    IF (LPLOTR.NE.835) GO TO 20                                     U  11
1980          CALL CALCMP (0.,0.,0.2)                                         U  12
1981          X=.5                                                            U  13
1982          IF (LVIEW.LT.0) X=2.                                            U  14
1983          CALL CALCMP (X,.5,0.3)                                          U  15
1984    20    CONTINUE                                                        U  16
1985          CALL AXIS (0.,0.,IDX,-36,W,0.,XO,DX,10.)                        U  17
1986          CALL AXIS (0.,0.,IDY,36,10.,90.,YO,DY,10.)                      U  18
1987          RETURN                                                          U  19
1988          ENTRY FINISH                                                    U  20
1989          CALL SYMBOL (W+.08,10.,.16,LAB,-90.,72)                         U  21
1990          CALL SYMBOL (W+.32,10.,.16,IDS,-90.,72)                         U  22
1991          IF (LPLOTR.EQ.765) CALL PLOT (W+3.,0.,23)                       U  23
1992          RETURN                                                          U  24
1993          END                                                             U  25-
1994          SUBROUTINE STRM (P,N,J,L,JSET,NDIM)                             V   1
1995          DIMENSION P(3,6,1), N(1), J(1), L(1)                            V   2
1996          COMMON /ARRAYS/ C(18)                                           V   3
1997          K=0                                                             V   4
1998    10    READ (12) C,LV                                                  V   5
1999          IF (LV.EQ.4) GO TO 50                                           V   6
2000          K=K+1                                                           V   7
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
2001  20    DO 30 I=1,3                                                    V   8
2002  30    P(I,K,JSET)=C(I)                                               V   9
2003        IF (K.LT.6) GO TO 10                                           V  10
2004  40    N(JSET)=K                                                      V  11
2005        J(JSET)=0                                                      V  12
2006        L(JSET)=0                                                      V  13
2007        CALL NEXT (P,N,J,L,JSET,NDIM)                                  V  14
2008        IF (K.LT.6) RETURN                                             V  15
2009        K=1                                                            V  16
2010        GO TO 20                                                       V  17
2011  50    IF (K.GT.1) GO TO 40                                           V  18
2012        RETURN                                                         V  19
2013        END                                                            V  20-
2014        SUBROUTINE UNITVZ (X,Y,Z)                                      W   1
2015        F=1./SQRT(X**2+Y**2+Z**2)                                      W   2
2016        X=F*X                                                          W   3
2017        Y=F*Y                                                          W   4
2018        Z=F*Z                                                          W   5
2019        RETURN                                                         W   6
2020        END                                                            W   7-
2021        SUBROUTINE VALUS (N,A,M,V,F)                                   X   1
2022  C     SELECT CONSTANT VALUES FOR CONTOUR PLOTS  DC TODD  7/23/71      X   2
2023        DIMENSION A(1), V(1)                                           X   3
2024        AB=0.                                                          X   4
2025        AS=0.                                                          X   5
2026        DO 10 I=1,N                                                    X   6
2027        AB=AB+A(I)                                                     X   7
2028  10    AS=AS+A(I)**2                                                  X   8
2029        AB=AB/N                                                        X   9
2030        AS=(AS/N-AB*AB)**.5                                            X  10
2031        B1=AB-F*AS                                                     X  11
2032        B2=AB+F*AS                                                     X  12
2033        CALL SKALE (B1,B2,M,IEXP,IDX,IMIN)                             X  13
2034        M=M+1                                                          X  14
2035        DX=IDX*10.**IEXP                                               X  15
2036        V(1)=IMIN*DX                                                   X  16
2037        DO 20 I=2,M                                                    X  17
2038  20    V(I)=V(I-1)+DX                                                 X  18
2039        RETURN                                                         X  19
2040        END                                                            X  20-
2041        SUBROUTINE VELY (P,N,J,L,JSET)                                 Y   1
2042        DIMENSION P(3,6,1), N(1), J(1), L(1)                           Y   2
2043        COMMON /ARRAYS/ C(3,6)                                         Y   3
2044        COMMON /FLOAT/ AN,AT,AV                                        Y   4
2045        DO 10 I=1,3                                                    Y   5
2046        P(I,1,JSET)=C(I,1)                                             Y   6
2047  10    P(I,2,JSET)=C(I,1)+AV*C(I,2)                                   Y   7
2048        N(JSET)=2                                                      Y   8
2049        J(JSET)=0                                                      Y   9
2050        L(JSET)=69                                                     Y  10
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
      RETURN                                                              Y  11
      END                                                                 Y  12-
      SUBROUTINE VIEW (N,P,X,Y)                                           Z   1
      DIMENSION P(3,1), X(1), Y(1)                                        Z   2
      COMMON /CVIEW/ L                                                    Z   3
      COMMON /VIEW4/ TT                                                   Z   4
      COMMON /VIEW5/ OX,OY,OZ,UX,UY,UZ,VX,VY,VZ,WX,WY,WZ                 Z   5
      IF (L.NE.1) GO TO 20                                                Z   6
      DO 10 K=1,N                                                         Z   7
      X(K)=P(2,K)                                                         Z   8
      Y(K)=P(3,K)                                                         Z   9
10    CONTINUE                                                            Z  10
      RETURN                                                              Z  11
20    IF (L.NE.2) GO TO 40                                                Z  12
      DO 30 K=1,N                                                         Z  13
      X(K)=P(1,K)                                                         Z  14
      Y(K)=P(3,K)                                                         Z  15
30    CONTINUE                                                            Z  16
      RETURN                                                              Z  17
40    IF (L.NE.3) GO TO 60                                                Z  18
      DO 50 K=1,N                                                         Z  19
      X(K)=P(1,K)                                                         Z  20
      Y(K)=P(2,K)                                                         Z  21
50    CONTINUE                                                            Z  22
      RETURN                                                              Z  23
60    IF (L.NE.4) GO TO 80                                                Z  24
      DO 70 K=1,N                                                         Z  25
      X(K)=P(1,K)-P(2,K)                                                  Z  26
      Y(K)=TT*(P(1,K)+P(2,K))+P(3,K)                                      Z  27
70    CONTINUE                                                            Z  28
      RETURN                                                              Z  29
80    IF (L.NE.5) GO TO 100                                               Z  30
      DO 90 K=1,N                                                         Z  31
      RX=P(1,K)-OX                                                        Z  32
      RY=P(2,K)-OY                                                        Z  33
      RZ=P(3,K)-OZ                                                        Z  34
      XP=RX*UX+RY*UY+RZ*UZ                                                Z  35
      YP=RX*VX+RY*VY+RZ*VZ                                                Z  36
      ZP=RX*WX+RY*WY+RZ*WZ                                                Z  37
      X(K)=-XP/ZP                                                         Z  38
      Y(K)=-YP/ZP                                                         Z  39
90    CONTINUE                                                            Z  40
      RETURN                                                              Z  41
100   CONTINUE                                                            Z  42
      RETURN                                                              Z  43
      END                                                                 Z  44-
      SUBROUTINE VIEWZ                                                   AA   1
      COMMON /ALPHA/ LABEL(36),IDX(9),IDY(9)                             AA   2
      COMMON /CVIEW/ L                                                   AA   3
      COMMON /FLOAT/ DUM(7),RPD                                          AA   4
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
      1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
2101        COMMON /VIEW4/ TT                                              AA   5
2102        IF (L.NE.1) GO TO 10                                           AA   6
2103        CALL LABELS (IDX,36H                  Y                 )      AA   7
2104        CALL LABELS (IDY,36H                  Z                 )      AA   8
2105        RETURN                                                         AA   9
2106  10    IF (L.NE.2) GO TO 20                                           AA  10
2107        CALL LABELS (IDX,36H                  X                 )      AA  11
2108        CALL LABELS (IDY,36H                  Z                 )      AA  12
2109        RETURN                                                         AA  13
2110  20    IF (L.NE.3) GO TO 30                                           AA  14
2111        CALL LABELS (IDX,36H                  X                 )      AA  15
2112        CALL LABELS (IDY,36H                  Y                 )      AA  16
2113        RETURN                                                         AA  17
2114  30    IF (L.NE.4) GO TO 40                                           AA  18
2115        CALL LABELS (IDX,36H            ISOMETRIC               )      AA  19
2116        CALL LABELS (IDY,36H                                    )      AA  20
2117        TT=TAN(RPD*30.)                                                AA  21
2118        RETURN                                                         AA  22
2119  40    IF (L.NE.5) GO TO 50                                           AA  23
2120        CALL LABELS (IDX,36H          PERSPECTIVE               )      AA  24
2121        CALL LABELS (IDY,36H                                    )      AA  25
2122        CALL VIEW5Z                                                    AA  26
2123        RETURN                                                         AA  27
2124  50    CONTINUE                                                       AA  28
2125        CALL LABELS (IDX,36H                                    )      AA  29
2126        CALL LABELS (IDY,36H                                    )      AA  30
2127        RETURN                                                         AA  31
2128        END                                                            AA  32-
2129        SUBROUTINE VIEW5Z                                              AB   1
2130        COMMON /CVIEW/ LDUMMY(2),LPOV                                  AB   2
2131        COMMON /FLOAT/ DUM(9),X1,X2,Y1,Y2,Z1,Z2                        AB   3
2132        COMMON /VIEW5/ OX,OY,OZ,UX,UY,UZ,VX,VY,VZ,WX,WY,WZ             AB   4
2133        IF (LPOV.EQ.0) GO TO 10                                        AB   5
2134        READ (5,30) OX,OY,OZ                                           AB   6
2135        READ (5,30) PX,PY,PZ                                           AB   7
2136        READ (5,30) QX,QY,QZ                                           AB   8
2137        GO TO 20                                                       AB   9
2138  10    OX=2.*X1-X2                                                    AB  10
2139        OY=2.*Y2-Y1                                                    AB  11
2140        OZ=2.*Z1-Z2                                                    AB  12
2141        PX=.25*(3.*X1+X2)                                              AB  13
2142        PY=.5*(Y1+Y2)                                                  AB  14
2143        PZ=.5*(Z1+Z2)                                                  AB  15
2144        QX=PX                                                          AB  16
2145        QY=PY                                                          AB  17
2146        QZ=Z2                                                          AB  18
2147  20    WX=OX-PX                                                       AB  19
2148        WY=OY-PY                                                       AB  20
2149        WZ=OZ-PZ                                                       AB  21
2150        VX=OX-QX                                                       AB  22
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
2151          VY=QY-QY                                                          A3  23
2152          VZ=QZ-QZ                                                          AB  24
2153          UX=WY*VZ-WZ*VY                                                    AB  25
2154          UY=WZ*VX-WX*VZ                                                    AB  26
2155          UZ=WX*VY-WY*VX                                                    AB  27
2156          CALL UNITYZ (UX,UY,UZ)                                            AB  28
2157          CALL UNITYZ (WX,WY,WZ)                                            AB  29
2158          VX=WY*UZ-WZ*UY                                                    A3  30
2159          VY=WZ*UX-WX*UZ                                                    AB  31
2160          VZ=WX*UY-WY*UX                                                    AB  32
2161          WRITE (6,40)                                                      AB  33
2162          WRITE (6,50) QX,QY,QZ,PX,PY,PZ,QX,QY,QZ                           AB  34
2163          RETURN                                                            A3  35
2164     C                                                                      AB  36
2165     30   FORMAT (7E10.0)                                                   AB  37
2166     40   FORMAT (5H0  QX,10X,2HQY,10X,2HQZ,10X,2HPX,10X,2HPY,10X,2HPZ,10X,2 AB  38
2167         1HQX,10X,2HQY,10X,2HQZ)                                           AB  39
2168     50   FORMAT (1P10E12.4)                                                AB  40
2169          END                                                               AB  41-
2170     //GO.PLOTTAPE DD UNIT=2400-2,LABEL=(,BLP),DSN=TODD,DISP=(,KEEP)             6
2171     //GO.FT20F001 DD UNIT=WORK,
2172     //     SPACE=(CYL,(1,1),RLSE,,ROUND)
2173     //GO.FT11F001 DD DSN=&&BODY,
2174     //     DISP=(OLD,DELETE)
2175     //GO.FT12F001 DD DSN=&&VELY,
2176     // DISP=(OLD,DELETE)
2177     //GO.FT05F001 DD *
2178     QUICK TURN WITH STRUT #1      M=.5
2179     0.         2.         .5         0.         90.        90.        5.
2180       765   20    1    1    1    1
2181         1
2182         2
2183         3
2184         4
2185         5    0   \ 1
2186     6.          30.         6.
2187     10.         0.          4.
2188     10.         0.          0.
2189        -1
2190         2    3    9    7    9
2191        -1
2192         2    3   10    7    9
2193        -1
2194         2    3    9    7    9    0   63
2195        -1
2196         2    3   10    7    9    0   63
2197         0
2198     /*
12345678901234567890123456789012345678901234567890123456789012345678901234567890
```

APPENDIX B
SAMPLE PROBLEM

Following is a sample problem for the flow analysis of a sting-strut configuration. The tabulation of the model coordinates and construction pattern of the model lattice following the method described in Section 3.3, Vol. II, is shown in Table B-1. The model data tabulation, which is derived from Table B-1 and that is used as the model input into PFP as described in Section 3.3, is shown in Table B-2. Five views of the model from the Plot Program are shown in Fig. B-1. These views allow the configuration to be checked for possible errors prior to initiating the PFP. The input data for PFP, as described in Sections 3.1 and 3.2, are shown in Table B-3. A tabulation of the velocity data described in Section 3.5 is given in Table B-4. The flow angularity data from Columns 9 and 10 are shown in Fig. B-2. A tabulation of the streamline data described in Section 3.5 is shown in Table B-5. The plots of the streamline data and vector plots of the flow angularity data from the velocity data are shown in Fig. B-3.

Table B-1. Coordinates and Construction Pattern of the Model Lattice

J	X	Y	Z
1	8.0000E 00	0.0	3.7500E 00
2	8.8800E 00	0.0	4.1700E 00
3	8.8800E 00	4.2000E-01	4.1700E 00
4	8.8800E 00	4.2000E-01	3.7500E 00
5	8.8800E 00	4.2000E-01	3.3300E 00
6	8.8800E 00	0.0	3.3300E 00
7	9.7800E 00	0.0	4.1700E 00
8	9.7800E 00	4.2000E-01	4.1700E 00
9	9.7800E 00	4.2000E-01	3.7500E 00
10	9.7800E 00	4.2000E-01	3.3300E 00
11	9.7800E 00	0.0	3.3300E 00
12	1.0750E 01	0.0	4.1700E 00
13	1.0750E 01	4.2000E-01	4.1700E 00
14	1.0750E 01	4.2000E-01	3.7500E 00
15	1.0750E 01	4.2000E-01	3.3300E 00
16	1.0750E 01	0.0	3.3300E 00
17	1.1850E 01	0.0	4.1700E 00
18	1.1850E 01	4.2000E-01	4.1700E 00
19	1.1850E 01	4.2000E-01	3.7500E 00
20	1.1850E 01	4.2000E-01	3.3300E 00
21	1.1850E 01	0.0	3.3300E 00
22	1.3210E 01	0.0	4.1700E 00
23	1.3210E 01	4.2000E-01	4.1700E 00
24	1.3210E 01	4.2000E-01	3.7500E 00
25	1.3210E 01	4.2000E-01	3.3300E 00
26	1.3210E 01	0.0	3.3300E 00
27	1.0000E 50	0.0	0.0

J	J1	J2	J3	J4	J
1	1	2	3	1	2
2	1	3	4	1	2
3	1	4	5	1	2
4	1	5	6	1	2
5	2	7	8	3	2
6	3	8	9	4	2
7	4	9	10	5	2
8	5	10	11	6	2
9	7	12	13	8	2
10	8	13	14	9	2
11	9	14	15	10	2
12	12	17	18	13	2
13	13	18	19	14	2
14	14	19	20	15	2
15	15	20	21	16	2
16	17	22	23	18	2
17	18	23	24	19	2
18	19	24	25	20	2
19	20	25	26	21	2
20	0	0	0	0	0

Table B-1. Continued

J	X	Y	Z
1	9.7800E 00	0.0	3.3300E 00
2	9.7800E 00	4.2000E-01	3.3300E 00
3	1.0750E 01	4.2000E-01	3.3300E 00
4	1.0750E 01	0.0	3.3300E 00
5	9.9800E 00	0.0	3.0000E 00
6	9.9800E 00	4.2000E-01	3.0000E 00
7	1.0450E 01	4.2000E-01	3.0000E 00
8	1.0960E 01	4.2000E-01	3.0000E 00
9	1.0960E 01	0.0	3.0000E 00
10	1.0290E 01	0.0	2.5000E 00
11	1.0290E 01	4.2000E-01	2.5000E 00
12	1.0770E 01	4.2000E-01	2.5000E 00
13	1.1260E 01	4.2000E-01	2.5000E 00
14	1.1260E 01	0.0	2.5000E 00
15	1.0600E 01	0.0	2.0000E 00
16	1.0600E 01	4.2000E-01	2.0000E 00
17	1.1080E 01	4.2000E-01	2.0000E 00
18	1.1570E 01	4.2000E-01	2.0000E 00
19	1.1570E 01	0.0	2.0000E 00
20	1.0910E 01	0.0	1.5000E 00
21	1.0910E 01	4.2000E-01	1.5000E 00
22	1.1400E 01	4.2000E-01	1.5000E 00
23	1.1880E 01	4.2000E-01	1.5000E 00
24	1.1880E 01	0.0	1.5000E 00
25	1.1210E 01	0.0	1.0000E 00
26	1.1210E 01	4.2000E-01	1.0000E 00
27	1.1710E 01	4.2000E-01	1.0000E 00
28	1.2190E 01	4.2000E-01	1.0000E 00
29	1.2190E 01	0.0	1.0000E 00
30	1.1530E 01	0.0	5.0000E-01
31	1.1530E 01	5.0000E-01	5.0000E-01
32	1.2030E 01	5.0000E-01	5.0000E-01
33	1.2500E 01	5.0000E-01	5.0000E-01
34	1.2500E 01	0.0	5.0000E-01
35	1.0000E 00	0.0	0.0

J	J1	J2	J3	J4	L
1	1	5	6	2	2
2	2	6	7	2	2
3	2	7	3	2	2
4	3	7	8	3	2
5	3	8	9	4	2
6	5	10	11	6	2
7	6	11	12	7	2
8	7	12	13	8	2
9	8	13	14	9	2
10	10	15	16	11	2
11	11	16	17	12	2
12	12	17	18	13	2
13	13	18	19	14	2
14	15	20	21	16	2
15	16	21	22	17	2
16	17	22	23	18	2
17	18	23	24	19	2
18	20	25	26	21	2
19	21	26	27	22	2
20	22	27	28	23	2
21	23	28	29	24	2
22	25	30	31	26	2

Table B-1. Continued

23	26	31	32	27	2
24	27	32	33	28	2
25	28	33	34	29	2
26	0	0	0	0	0

J	X	Y	Z
1	1.2500E 01	0.0	-5.0000E-01
2	1.2130E 01	0.0	-5.0000E-01
3	1.1830E 01	0.0	0.0
4	1.1530E 01	0.0	5.0000E-01
5	1.2500E 01	5.0000E-01	-5.0000E-01
6	1.2130E 01	5.0000E-01	-5.0000E-01
7	1.1830E 01	5.0000E-01	0.0
8	1.1530E 01	5.0000E-01	5.0000E-01
9	1.2500E 01	5.0000E-01	-5.0000E-01
10	1.2270E 01	5.0000E-01	0.0
11	1.2030E 01	5.0000E-01	5.0000E-01
12	1.3240E 01	5.0000E-01	-5.0000E-01
13	1.3130E 01	5.0000E-01	0.0
14	1.2500E 01	5.0000E-01	5.0000E-01
15	1.2500E 01	0.0	5.0000E-01
16	1.3000E 01	5.0000E-01	5.0000E-01
17	1.3000E 01	0.0	5.0000E-01
18	1.3820E 01	5.0000E-01	-5.0000E-01
19	1.3820E 01	5.0000E-01	0.0
20	1.3820E 01	5.0000E-01	5.0000E-01
21	1.3820E 01	0.0	5.0000E-01
22	1.0000E 50	0.0	0.0

J	J1	J2	J3	J4	L
1	1	5	6	2	2
2	2	6	7	3	2
3	3	7	8	4	2
4	6	9	10	7	2
5	7	10	11	8	2
6	9	12	13	10	2
7	10	13	14	11	2
8	12	18	19	13	2
9	13	19	20	16	2
10	13	16	14	13	2
11	14	16	17	15	2
12	16	20	21	17	2
13	0	0	0	0	0

Table B-1. Continued

J	X	Y	Z
1	1.2500F 01	0.0	-5.0000E-01
2	1.2500E 01	5.0000E-01	-5.0000E-01
3	1.3240E 01	5.0000E-01	-5.0000E-01
4	1.3820E 01	5.0000E-01	-5.0000E-01
5	1.3820E 01	0.0	-5.0000E-01
6	1.2750E 01	0.0	-1.0000E 00
7	1.275UE 01	5.0000E-01	-1.0000E 00
8	1.3320E 01	5.0000E-01	-1.0000E 00
9	1.3820E 01	5.0000E-01	-1.0000E 00
10	1.3820E 01	0.0	-1.0000E 00
11	1.3000E 01	0.0	-1.5500E 00
12	1.3000E 01	5.0000E-01	-1.5500E 00
13	1.340UE 01	5.0000E-01	-1.5500E 00
14	1.3820E 01	5.0000E-01	-1.5500E 00
15	1.3820E 01	0.0	-1.5500E 00
16	1.3100E 01	0.0	-2.2500E 00
17	1.3100E 01	4.2000E-01	-2.2500E 00
18	1.3470E 01	4.2000E-01	-2.2500E 00
19	1.3820E 01	4.2000E-01	-2.2500E 00
20	1.3820E 01	0.0	-2.2500E 00
21	1.3200E 01	0.0	-2.9500E 00
22	1.3200E 01	4.2000E-01	-2.9500E 00
23	1.3550E 01	4.2000E-01	-2.9500E 00
24	1.3820E 01	4.2000E-01	-2.9500E 00
25	1.3820E 01	0.0	-2.9500E 00
26	1.0000E 50	0.0	0.0

J	J1	J2	J3	J4	L
1	1	6	7	2	2
2	2	7	8	3	2
3	3	8	9	4	2
4	4	9	10	5	2
5	6	11	12	7	2
6	7	12	13	8	2
7	8	13	14	9	2
8	9	14	15	10	2
9	11	16	17	12	2
10	12	17	18	13	2
11	13	18	19	14	2
12	14	19	20	15	2
13	16	21	22	17	2
14	17	22	23	18	2
15	18	23	24	19	2
16	19	24	25	20	2
17	0	0	0	0	0

Table B-1. Continued

J	X	Y	Z
1	1.2850E 01	0.0	0.0
2	1.3750E 01	3.7000E-01	0.0
3	1.3750E 01	3.6000E-01	1.0000E-01
4	1.3750E 01	2.6000E-01	2.6000E-01
5	1.3750E 01	1.0000E-01	3.6000E-01
6	1.3750E 01	0.0	3.7000E-01
7	1.4270E 01	5.7000E-01	0.0
8	1.4270E 01	5.4000E-01	1.4000E-01
9	1.4270E 01	4.1000E-01	4.1000E-01
10	1.4270E 01	1.4000E-01	5.4000E-01
11	1.4270E 01	0.0	5.7000E-01
12	1.4850E 01	8.0000E-01	0.0
13	1.4850E 01	7.7000E-01	2.1000E-01
14	1.4850E 01	5.6000E-01	5.6000E-01
15	1.4850E 01	2.1000E-01	7.7000E-01
16	1.4850E 01	0.0	8.0000E-01
17	1.5900E 01	8.0000E-01	0.0
18	1.5900E 01	7.7000E-01	2.1000E-01
19	1.5900E 01	5.6000E-01	5.6000E-01
20	1.5900E 01	2.1000E-01	7.7000E-01
21	1.5900E 01	0.0	8.0000E-01
22	1.6030E 01	6.7000E-01	0.0
23	1.6030E 01	6.4000E-01	1.7000E-01
24	1.6030E 01	4.8000E-01	4.8000E-01
25	1.6030E 01	1.7000E-01	6.4000E-01
26	1.6030E 01	0.0	6.7000E-01
27	1.7300E 01	6.7000E-01	0.0
28	1.7300E 01	6.7000E-01	4.5000E-01
29	1.7300E 01	4.5000E-01	6.7000E-01
30	1.7300E 01	0.0	6.7000E-01
31	1.8000E 01	0.0	6.7000E-01
32	1.8300E 01	6.7000E-01	0.0
33	1.8300E 01	6.7000E-01	5.6000E-01
34	1.8300E 01	5.6000E-01	6.7000E-01
35	1.8300E 01	2.0000E-01	6.7000E-01
36	1.9040E 01	6.7000E-01	0.0
37	1.9040E 01	6.7000E-01	6.7000E-01
38	1.9040E 01	3.3000E-01	6.7000E-01
39	2.0500E 01	6.7000E-01	0.0
40	2.0500E 01	6.7000E-01	6.7000E-01
41	2.0360E 01	3.3000E-01	6.7000E-01
42	2.2300E 01	6.7000E-01	0.0
43	2.2300E 01	6.7000E-01	6.7000E-01
44	2.2060E 01	3.3000E-01	6.7000E-01
45	2.4500E 01	6.7000E-01	0.0
46	2.4500E 01	6.7000E-01	6.7000E-01
47	2.3970E 01	3.3000E-01	6.7000E-01
48	2.6370E 01	3.0000E-01	0.0
49	2.6370E 01	3.0000E-01	6.7000E-01
50	2.6370E 01	0.0	6.7000E-01
51	2.8000E 01	0.0	0.0
52	2.8000E 01	0.0	6.7000E-01
53	1.8000E 01	0.0	6.7000E-01
54	1.9000E 01	0.0	1.9200E 00
55	1.8000E 01	0.0	3.7000E 00
56	1.8000E 01	0.0	5.7700E 00
57	1.8000E 01	0.0	8.0000E 00
58	1.8300E 01	2.0000E-01	6.7000E-01
59	1.8300E 01	2.0000E-01	1.9200E 00

Table B-1. Continued

60	1.8300E 01	2.0000E-01	3.7000E 00
61	1.8300E 01	2.0000E-01	5.7700E 00
62	1.8300E 01	2.0000E-01	8.0000E 00
63	1.9040E 01	3.3000E-01	6.7000E-01
64	1.9040E 01	3.3000E-01	1.9200E 00
65	1.9040E 01	3.3000E-01	3.7000E 00
66	1.9040E 01	3.3000E-01	5.7700E 00
67	1.9040E 01	3.3000E-01	8.0000E 00
68	2.0360E 01	3.3000E-01	6.7000E-01
69	2.0300E 01	3.3000E-01	1.9200E 00
70	2.0220E 01	3.3000E-01	3.7000E 00
71	2.0170E 01	3.3000E-01	5.7700E 00
72	2.0080E 01	3.3000E-01	8.0000E 00
73	2.2060E 01	3.3000E-01	6.7000E-01
74	2.1950E 01	3.3000E-01	1.9200E 00
75	2.1830E 01	3.3000E-01	3.7000E 00
76	2.1700E 01	3.3000E-01	5.7700E 00
77	2.1540E 01	3.3000E-01	8.0000E 00
78	2.3970E 01	3.3000E-01	6.7000E-01
79	2.3830E 01	3.3000E-01	1.9200E 00
80	2.3630E 01	3.3000E-01	3.7000E 00
81	2.3400E 01	3.3000E-01	5.7700E 00
82	2.3160E 01	3.3000E-01	8.0000E 00
83	2.6370E 01	0.0	6.7000E-01
84	2.6220E 01	0.0	1.9200E 00
85	2.6040E 01	0.0	3.7000E 00
86	2.5820E 01	0.0	5.7700E 00
87	2.5580E 01	0.0	8.0000E 00
89	1.0000E 50	0.0	0.0

J	J1	J2	J3	J4	L
1	1	2	3	1	2
2	1	3	4	1	2
3	1	4	5	1	2
4	1	5	6	1	2
5	2	7	8	3	2
6	3	8	9	4	2
7	4	9	10	5	2
8	5	10	11	6	2
9	7	12	13	8	2
10	8	13	14	9	2
11	9	14	15	10	2
12	10	15	16	11	2
13	12	17	18	13	2
14	13	18	19	14	2
15	14	19	20	15	2
16	15	20	21	16	2
17	17	22	23	18	2
18	18	23	24	19	2
19	19	24	25	20	2
20	20	25	26	21	2
21	22	27	28	23	2
22	23	28	28	24	2
23	24	28	29	25	2
24	25	29	30	26	2
25	29	31	31	30	2
26	27	32	33	28	2
27	28	33	34	29	2
28	29	34	35	31	2
29	32	36	37	33	2
30	33	37	37	34	2
31	34	37	38	35	2
32	36	39	40	37	2
33	37	40	41	38	2
34	39	42	43	40	2
35	40	43	44	41	2

Table B-1. Concluded

36	42	45	46	43	2
37	43	46	47	44	2
38	45	48	49	46	2
39	46	49	50	47	2
40	48	51	52	49	2
41	49	52	52	50	2
42	53	58	59	54	2
43	54	59	60	55	2
44	55	60	61	56	2
45	56	61	62	57	2
46	58	63	64	59	2
47	59	64	65	60	2
48	60	65	66	61	2
49	61	66	67	62	2
50	63	68	69	64	2
51	64	69	70	65	2
52	65	70	71	66	2
53	66	71	72	67	2
54	68	73	74	69	2
55	69	74	75	70	2
56	70	75	76	71	2
57	71	76	77	72	2
58	73	78	79	74	2
59	74	79	80	75	2
60	75	80	81	76	2
61	76	81	82	77	2
62	78	83	84	79	2
63	79	84	85	80	2
64	80	85	86	81	2
65	81	86	87	82	2
66	0	0	0	0	0

STOP

Table B-2. Model Input Data Tabulation

QUICK TURN WITH STRUT #1 M=.5
MODEL DATA PAGE 1

1		8.0000E 00	0.0	3.7500E 00	8.8800E 00	0.0	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	8.8800E 00	4.2000E-01	4.1700E 00	8.0000E 00	0.0	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
2		8.0000E 00	0.0	3.7500E 00	8.8800E 00	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	8.8800E 00	4.2000E-01	3.7500E 00	8.0000E 00	0.0	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
3		8.0000E 00	0.0	3.7500E 00	8.8800E 00	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	8.8800E 00	4.2000E-01	3.3300E 00	8.0000E 00	0.0	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
4		8.0000E 00	0.0	3.7500E 00	8.8800E 00	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	8.8800E 00	0.0	3.3300E 00	8.0000E 00	0.0	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
5		8.8800E 00	0.0	4.1700E 00	9.7800E 00	0.0	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	9.7800E 00	4.2000E-01	4.1700E 00	8.8800E 00	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
6		8.8800E 00	4.2000E-01	4.1700E 00	9.7800E 00	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	9.7800E 00	4.2000E-01	3.7500E 00	8.8800E 00	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
7		8.8800E 00	4.2000E-01	3.7500E 00	9.7800E 00	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	9.7800E 00	4.2000E-01	3.3300E 00	8.8800E 00	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
8		8.8800E 00	4.2000E-01	3.3300E 00	9.7800E 00	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	9.7800E 00	0.0	3.3300E 00	8.8800E 00	0.0	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
9		9.7800E 00	0.0	4.1700E 00	1.0750E 01	0.0	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0750E 01	4.2000E-01	4.1700E 00	9.7800E 00	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
10		9.7800E 00	4.2000E-01	4.1700E 00	1.0750E 01	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0750E 01	4.2000E-01	3.7500E 00	9.7800E 00	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
11		9.7800E 00	4.2000E-01	3.7500E 00	1.0750E 01	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0750E 01	4.2000E-01	3.3300E 00	9.7800E 00	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
12		1.0750E 01	0.0	4.1700E 00	1.1850E 01	0.0	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1850E 01	4.2000E-01	4.1700E 00	1.0750E 01	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
13		1.0750E 01	4.2000E-01	4.1700E 00	1.1850E 01	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1850E 01	4.2000E-01	3.7500E 00	1.0750E 01	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
14		1.0750E 01	4.2000E-01	3.7500E 00	1.1850E 01	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1850E 01	4.2000E-01	3.3300E 00	1.0750E 01	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
15		1.0750E 01	4.2000E-01	3.3300E 00	1.1850E 01	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1850E 01	0.0	3.3300E 00	1.0750E 01	0.0	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
16		1.1850E 01	0.0	4.1700E 00	1.3210E 01	0.0	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3210E 01	4.2000E-01	4.1700E 00	1.1850E 01	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
17		1.1850E 01	4.2000E-01	4.1700E 00	1.3210E 01	4.2000E-01	4.1700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3210E 01	4.2000E-01	3.7500E 00	1.1850E 01	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
18		1.1850E 01	4.2000E-01	3.7500E 00	1.3210E 01	4.2000E-01	3.7500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3210E 01	4.2000E-01	3.3300E 00	1.1850E 01	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
19		1.1850E 01	4.2000E-01	3.3300E 00	1.3210E 01	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3210E 01	0.0	3.3300E 00	1.1850E 01	0.0	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
20		9.7800E 00	0.0	3.3300E 00	9.9800E 00	0.0	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	9.9800E 00	4.2000E-01	3.0000E 00	9.7800E 00	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
21		9.7800E 00	4.2000E-01	3.3300E 00	9.9800E 00	4.2000E-01	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0450E 01	4.2000E-01	3.0000E 00	9.7800E 00	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
22		9.7800E 00	4.2000E-01	3.3300E 00	1.0450E 01	4.2000E-01	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0750E 01	4.2000E-01	3.3300E 00	9.7800E 00	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
23		1.0750E 01	4.2000E-01	3.3300E 00	1.0450E 01	4.2000E-01	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0960E 01	4.2000E-01	3.0000E 00	1.0750E 01	4.2000E-01	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
24		1.0750E 01	4.2000E-01	3.3300E 00	1.0960E 01	4.2000E-01	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0960E 01	0.0	3.0000E 00	1.0750E 01	0.0	3.3300E 00	1.0000E 50	1.0000E 50	1.0000E 50
25		9.9800E 00	0.0	3.0000E 00	1.0290E 01	0.0	2.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0290E 01	4.2000E-01	2.5000E 00	9.9800E 00	4.2000E-01	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50

Table B-2. Continued

QUICK TURN WITH STRUT #1 M=.5
MODEL DATA PAGE 2

26		9.9800E 00	4.2000E-01	3.0000E 00	1.0290E 01	4.2000E-01	2.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0770E 01	4.2000E-01	2.5000E 00	1.0450E 01	4.2000E-01	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
27		1.0450E 01	4.2000E-01	3.0000E 00	1.0770E 01	4.2000E-01	2.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1260E 01	4.2000E-01	2.5000E 00	1.0960E 01	4.2000E-01	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
28		1.0960E 01	4.2000E-01	3.0000E 00	1.1260E 01	4.2000E-01	2.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1260E 01	0.0	2.5000E 00	1.0960E 01	0.0	3.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
29		1.0290E 01	0.0	2.5000E 00	1.0600E 01	0.0	2.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0600E 01	4.2000E-01	2.0000E 00	1.0290E 01	4.2000E-01	2.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
30		1.0290E 01	4.2000E-01	2.5000E 00	1.0600E 01	4.2000E-01	2.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1080E 01	4.2000E-01	2.0000E 00	1.0770E 01	4.2000E-01	2.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
31		1.0770E 01	4.2000E-01	2.5000E 00	1.1080E 01	4.2000E-01	2.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1570E 01	4.2000E-01	2.0000E 00	1.1260E 01	4.2000E-01	2.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
32		1.1260E 01	4.2000E-01	2.5000E 00	1.1570E 01	4.2000E-01	2.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1570E 01	0.0	2.0000E 00	1.1260E 01	0.0	2.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
33		1.0600E 01	0.0	2.0000E 00	1.0910E 01	0.0	1.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.0910E 01	4.2000E-01	1.5000E 00	1.0600E 01	4.2000E-01	2.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
34		1.0600E 01	4.2000E-01	2.0000E 00	1.0910E 01	4.2000E-01	1.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1400E 01	4.2000E-01	1.5000E 00	1.1080E 01	4.2000E-01	2.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
35		1.1080E 01	4.2000E-01	2.0000E 00	1.1400E 01	4.2000E-01	1.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1880E 01	4.2000E-01	1.5000E 00	1.1570E 01	4.2000E-01	2.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
36		1.1570E 01	4.2000E-01	2.0000E 00	1.1880E 01	4.2000E-01	1.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1880E 01	0.0	1.5000E 00	1.1570E 01	0.0	2.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
37		1.0910E 01	0.0	1.5000E 00	1.1210E 01	0.0	1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1210E 01	4.2000E-01	1.0000E 00	1.0910E 01	4.2000E-01	1.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
38		1.0910E 01	4.2000E-01	1.5000E 00	1.1210E 01	4.2000E-01	1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1710E 01	4.2000E-01	1.0000E 00	1.1400E 01	4.2000E-01	1.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
39		1.1400E 01	4.2000E-01	1.5000E 00	1.1710E 01	4.2000E-01	1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2190E 01	4.2000E-01	1.0000E 00	1.1880E 01	4.2000E-01	1.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
40		1.1880E 01	4.2000E-01	1.5000E 00	1.2190E 01	4.2000E-01	1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2190E 01	0.0	1.0000E 00	1.1880E 01	0.0	1.5000E 00	1.0000E 50	1.0000E 50	1.0000E 50
41		1.1210E 01	0.0	1.0000E 00	1.1530E 01	0.0	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1530E 01	5.0000E-01	5.0000E-01	1.1210E 01	4.2000E-01	1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
42		1.1210E 01	4.2000E-01	1.0000E 00	1.1530E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2030E 01	5.0000E-01	5.0000E-01	1.1710E 01	4.2000E-01	1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
43		1.1710E 01	4.2000E-01	1.0000E 00	1.2030E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2500E 01	5.0000E-01	5.0000E-01	1.2190E 01	4.2000E-01	1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
44		1.2190E 01	4.2000E-01	1.0000E 00	1.2500E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2500E 01	0.0	5.0000E-01	1.2190E 01	0.0	1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
45		1.2500E 01	0.0	-5.0000E-01	1.2500E 01	5.0000E-01	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2130E 01	5.0000E-01	-5.0000E-01	1.2130E 01	0.0	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
46		1.2130E 01	0.0	-5.0000E-01	1.2130E 01	5.0000E-01	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1830E 01	5.0000E-01	0.0	1.1830E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
47		1.1830E 01	0.0	0.0	1.1830E 01	5.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.1530E 01	5.0000E-01	5.0000E-01	1.1530E 01	0.0	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
48		1.2130E 01	5.0000E-01	-5.0000E-01	1.2500E 01	5.0000E-01	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2270E 01	5.0000E-01	0.0	1.1830E 01	5.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
49		1.1830E 01	5.0000E-01	0.0	1.2270E 01	5.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2030E 01	5.0000E-01	5.0000E-01	1.1530E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
50		1.2500E 01	5.0000E-01	-5.0000E-01	1.3240E 01	5.0000E-01	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3130E 01	5.0000E-01	0.0	1.2270E 01	5.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50

Table B-2. Continued

QUICK TURN WITH STRUT #1 M=.5
MODEL DATA PAGE 3

51		1.2270E 01	5.0000E-01	0.0	1.3130E 01	5.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2500E 01	5.0000E-01	5.0000E-01	1.2030E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
52		1.3240E 01	5.0000E-01	-5.0000E-01	1.3820E 01	5.0000E-01	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	5.0000E-01	0.0	1.3130E 01	5.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
53		1.3130E 01	5.0000E-01	0.0	1.3820E 01	5.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	5.0000E-01	5.0000E-01	1.3000E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
54		1.3130E 01	5.0000E-01	0.0	1.3000E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2500E 01	5.0000E-01	5.0000E-01	1.3130E 01	5.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
55		1.2500E 01	5.0000E-01	5.0000E-01	1.3000E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3000E 01	0.0	5.0000E-01	1.2500E 01	0.0	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
56		1.3000E 01	5.0000E-01	5.0000E-01	1.3820E 01	5.0000E-01	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	0.0	5.0000E-01	1.3000E 01	0.0	5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
57		1.2500E 01	0.0	-5.0000E-01	1.2750E 01	0.0	-1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.2750E 01	5.0000E-01	-1.0000E 00	1.2500E 01	5.0000E-01	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
58		1.2500E 01	5.0000E-01	-5.0000E-01	1.2750E 01	5.0000E-01	-1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3320E 01	5.0000E-01	-1.0000E 00	1.3240E 01	5.0000E-01	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
59		1.3240E 01	5.0000E-01	-5.0000E-01	1.3320E 01	5.0000E-01	-1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	5.0000E-01	-1.0000E 00	1.3820E 01	5.0000E-01	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
60		1.3820E 01	5.0000E-01	-5.0000E-01	1.3820E 01	5.0000E-01	-1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	0.0	-1.0000E 00	1.3820E 01	0.0	-5.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
61		1.2750E 01	0.0	-1.0000E 00	1.3000E 01	0.0	-1.5500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3000E 01	5.0000E-01	-1.5500E 00	1.2750E 01	5.0000E-01	-1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
62		1.2750E 01	5.0000E-01	-1.0000E 00	1.3000E 01	5.0000E-01	-1.5500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3400E 01	5.0000E-01	-1.5500E 00	1.3320E 01	5.0000E-01	-1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
63		1.3320E 01	5.0000E-01	-1.0000E 00	1.3400E 01	5.0000E-01	-1.5500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	5.0000E-01	-1.5500E 00	1.3820E 01	5.0000E-01	-1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
64		1.3820E 01	5.0000E-01	-1.0000E 00	1.3820E 01	5.0000E-01	-1.5500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	0.0	-1.5500E 00	1.3820E 01	0.0	-1.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
65		1.3000E 01	0.0	-1.5500E 00	1.3100E 01	0.0	-2.2500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3100E 01	4.2000E-01	-2.2500E 00	1.3000E 01	5.0000E-01	-1.5500E 00	1.0000E 50	1.0000E 50	1.0000E 50
66		1.3000E 01	5.0000E-01	-1.5500E 00	1.3100E 01	4.2000E-01	-2.2500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3470E 01	4.2000E-01	-2.2500E 00	1.3400E 01	5.0000E-01	-1.5500E 00	1.0000E 50	1.0000E 50	1.0000E 50
67		1.3400E 01	5.0000E-01	-1.5500E 00	1.3470E 01	4.2000E-01	-2.2500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	4.2000E-01	-2.2500E 00	1.3820E 01	5.0000E-01	-1.5500E 00	1.0000E 50	1.0000E 50	1.0000E 50
68		1.3820E 01	5.0000E-01	-1.5500E 00	1.3820E 01	4.2000E-01	-2.2500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	0.0	-2.2500E 00	1.3820E 01	0.0	-1.5500E 00	1.0000E 50	1.0000E 50	1.0000E 50
69		1.3100E 01	0.0	-2.2500E 00	1.3200E 01	0.0	-2.9500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3200E 01	4.2000E-01	-2.9500E 00	1.3100E 01	4.2000E-01	-2.2500E 00	1.0000E 50	1.0000E 50	1.0000E 50
70		1.3100E 01	4.2000E-01	-2.2500E 00	1.3200E 01	4.2000E-01	-2.9500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3550E 01	4.2000E-01	-2.9500E 00	1.3470E 01	4.2000E-01	-2.2500E 00	1.0000E 50	1.0000E 50	1.0000E 50
71		1.3470E 01	4.2000E-01	-2.2500E 00	1.3550E 01	4.2000E-01	-2.9500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	4.2000E-01	-2.9500E 00	1.3820E 01	4.2000E-01	-2.2500E 00	1.0000E 50	1.0000E 50	1.0000E 50
72		1.3820E 01	4.2000E-01	-2.2500E 00	1.3820E 01	4.2000E-01	-2.9500E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3820E 01	0.0	-2.9500E 00	1.3820E 01	0.0	-2.2500E 00	1.0000E 50	1.0000E 50	1.0000E 50
73		1.2850E 01	0.0	0.0	1.3750E 01	3.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3750E 01	3.6000E-01	1.0000E-01	1.2850E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
74		1.2850E 01	0.0	0.0	1.3750E 01	3.6000E-01	1.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3750E 01	2.6000E-01	2.6000E-01	1.2850E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
75		1.2850E 01	0.0	0.0	1.3750E 01	2.6000E-01	2.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3750E 01	1.0000E-01	3.6000E-01	1.2850E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50

Table B-2. Continued

QUICK TURN WITH STRUT #1 M=.5
MODEL DATA PAGE 4

76		1.2850E 01	0.0	0.0	1.3750E 01	1.0000E-01	3.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3750E 01	0.0	3.7000E-01	1.2850E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
77		1.3750E 01	3.7000E-01	0.0	1.4270E 01	5.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4270E 01	5.4000E-01	1.4000E-01	1.3750E 01	3.6000E-01	1.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
78		1.3750E 01	3.6000E-01	1.0000E-01	1.4270E 01	5.4000E-01	1.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4270E 01	4.1000E-01	4.1000E-01	1.3750E 01	2.6000E-01	2.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
79		1.3750E 01	2.6000E-01	2.6000E-01	1.4270E 01	4.1000E-01	4.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4270E 01	1.4000E-01	5.4000E-01	1.3750E 01	1.0000E-01	3.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
80		1.3750E 01	1.0000E-01	3.6000E-01	1.4270E 01	1.4000E-01	5.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4270E 01	0.0	5.7000E-01	1.3750E 01	0.0	3.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
81		1.4270E 01	5.7000E-01	0.0	1.4850E 01	8.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4850E 01	7.7000E-01	2.1000E-01	1.4270E 01	5.4000E-01	1.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
82		1.4270E 01	5.4000E-01	1.4000E-01	1.4850E 01	7.7000E-01	2.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4850E 01	5.6000E-01	5.6000E-01	1.4270E 01	4.1000E-01	4.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
83		1.4270E 01	4.1000E-01	4.1000E-01	1.4850E 01	5.6000E-01	5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4850E 01	2.1000E-01	7.7000E-01	1.4270E 01	1.4000E-01	5.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
84		1.4270E 01	1.4000E-01	5.4000E-01	1.4850E 01	2.1000E-01	7.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4850E 01	0.0	8.0000E-01	1.4270E 01	0.0	5.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
85		1.4850E 01	8.0000E-01	0.0	1.5900E 01	8.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.5900E 01	7.7000E-01	2.1000E-01	1.4850E 01	7.7000E-01	2.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
86		1.4850E 01	7.7000E-01	2.1000E-01	1.5900E 01	7.7000E-01	2.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.5900E 01	5.6000E-01	5.6000E-01	1.4850E 01	5.6000E-01	5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
87		1.4850E 01	5.6000E-01	5.6000E-01	1.5900E 01	5.6000E-01	5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.5900E 01	2.1000E-01	7.7000E-01	1.4850E 01	2.1000E-01	7.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
88		1.4850E 01	2.1000E-01	7.7000E-01	1.5900E 01	2.1000E-01	7.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.5900E 01	0.0	8.0000E-01	1.4850E 01	0.0	8.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
89		1.5900E 01	8.0000E-01	0.0	1.6030E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.6030E 01	6.4000E-01	1.7000E-01	1.5900E 01	7.7000E-01	2.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
90		1.5900E 01	7.7000E-01	2.1000E-01	1.6030E 01	6.4000E-01	1.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.6030E 01	4.8000E-01	4.8000E-01	1.5900E 01	5.6000E-01	5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
91		1.5900E 01	5.6000E-01	5.6000E-01	1.6030E 01	4.8000E-01	4.8000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.6030E 01	1.7000E-01	6.4000E-01	1.5900E 01	2.1000E-01	7.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
92		1.5900E 01	2.1000E-01	7.7000E-01	1.6030E 01	1.7000E-01	6.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.6030E 01	0.0	6.7000E-01	1.5900E 01	0.0	8.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
93		1.6030E 01	6.7000E-01	0.0	1.7300E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.7300E 01	6.7000E-01	4.5000E-01	1.6030E 01	6.4000E-01	1.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
94		1.6030E 01	6.4000E-01	1.7000E-01	1.7300E 01	6.7000E-01	4.5000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.7300E 01	6.7000E-01	4.5000E-01	1.6030E 01	4.8000E-01	4.8000E-01	1.0000E 50	1.0000E 50	1.0000E 50
95		1.6030E 01	4.8000E-01	4.8000E-01	1.7300E 01	6.7000E-01	4.5000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.7300E 01	4.5000E-01	6.7000E-01	1.6030E 01	1.7000E-01	6.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
96		1.6030E 01	1.7000E-01	6.4000E-01	1.7300E 01	4.5000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.7300E 01	0.0	6.7000E-01	1.6030E 01	0.0	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
97		1.7300E 01	4.5000E-01	6.7000E-01	1.8000E 01	0.0	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8000E 01	0.0	6.7000E-01	1.7300E 01	0.0	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
98		1.7300E 01	6.7000E-01	0.0	1.8300E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	6.7000E-01	5.6000E-01	1.7300E 01	6.7000E-01	4.5000E-01	1.0000E 50	1.0000E 50	1.0000E 50
99		1.7300E 01	6.7000E-01	4.5000E-01	1.8300E 01	6.7000E-01	5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	5.6000E-01	6.7000E-01	1.7300E 01	4.5000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
100		1.7300E 01	4.5000E-01	6.7000E-01	1.8300E 01	5.6000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	6.7000E-01	1.8000E 01	0.0	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50

Table B-2. Continued

QUICK TURN WITH STRUT #1 M=.5
MODEL DATA PAGE 5

101		1.8300E 01	6.7000E-01	0.0	1.9040E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	6.7000E-01	6.7000E-01	1.8300E 01	6.7000E-01	5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
102		1.8300E 01	6.7000E-01	5.6000E-01	1.9040E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	6.7000E-01	6.7000E-01	1.8300E 01	5.6000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
103		1.8300E 01	5.6000E-01	6.7000E-01	1.9040E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	6.7000E-01	1.8300E 01	2.0000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
104		1.9040E 01	6.7000E-01	0.0	2.0500E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0500E 01	6.7000E-01	6.7000E-01	1.9040E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
105		1.9040E 01	6.7000E-01	6.7000E-01	2.0500E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0360E 01	3.3000E-01	6.7000E-01	1.9040E 01	3.3000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
106		2.0500E 01	6.7000E-01	0.0	2.2300E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.2300E 01	6.7000E-01	6.7000E-01	2.0500E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
107		2.0500E 01	6.7000E-01	6.7000E-01	2.2300E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.2060E 01	3.3000E-01	6.7000E-01	2.0360E 01	3.3000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
108		2.2300E 01	6.7000E-01	0.0	2.4500E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.4500E 01	6.7000E-01	6.7000E-01	2.2300E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
109		2.2300E 01	6.7000E-01	6.7000E-01	2.4500E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3970E 01	3.3000E-01	6.7000E-01	2.2060E 01	3.3000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
110		2.4500E 01	6.7000E-01	0.0	2.6370E 01	3.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.6370E 01	3.0000E-01	6.7000E-01	2.4500E 01	6.7000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
111		2.4500E 01	6.7000E-01	6.7000E-01	2.6370E 01	3.0000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.6370E 01	0.0	6.7000E-01	2.3970E 01	3.3000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
112		2.6370E 01	3.0000E-01	0.0	2.8000E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.8000E 01	0.0	6.7000E-01	2.6370E 01	3.0000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
113		2.6370E 01	3.0000E-01	6.7000E-01	2.8000E 01	0.0	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.8000E 01	0.0	6.7000E-01	2.6370E 01	0.0	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
114		1.8000E 01	0.0	6.7000E-01	1.8300E 01	2.0000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	1.9200E 00	1.8000E 01	0.0	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
115		1.8000E 01	0.0	1.9200E 00	1.8300E 01	2.0000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	3.7000E 00	1.8000E 01	0.0	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
116		1.8000E 01	0.0	3.7000E 00	1.8300E 01	2.0000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	5.7700E 00	1.8000E 01	0.0	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
117		1.8000E 01	0.0	5.7700E 00	1.8300E 01	2.0000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	8.0000E 00	1.8000E 01	0.0	8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
118		1.8300E 01	2.0000E-01	6.7000E-01	1.9040E 01	3.3000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	1.9200E 00	1.8300E 01	2.0000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
119		1.8300E 01	2.0000E-01	1.9200E 00	1.9040E 01	3.3000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	3.7000E 00	1.8300E 01	2.0000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
120		1.8300E 01	2.0000E-01	3.7000E 00	1.9040E 01	3.3000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	5.7700E 00	1.8300E 01	2.0000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
121		1.8300E 01	2.0000E-01	5.7700E 00	1.9040E 01	3.3000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	8.0000E 00	1.8300E 01	2.0000E-01	8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
122		1.9040E 01	3.3000E-01	6.7000E-01	2.0360E 01	3.3000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0300E 01	3.3000E-01	1.9200E 00	1.9040E 01	3.3000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
123		1.9040E 01	3.3000E-01	1.9200E 00	2.0300E 01	3.3000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0220E 01	3.3000E-01	3.7000E 00	1.9040E 01	3.3000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
124		1.9040E 01	3.3000E-01	3.7000E 00	2.0220E 01	3.3000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0170E 01	3.3000E-01	5.7700E 00	1.9040E 01	3.3000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
125		1.9040E 01	3.3000E-01	5.7700E 00	2.0170E 01	3.3000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0080E 01	3.3000E-01	8.0000E 00	1.9040E 01	3.3000E-01	8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50

Table B-2. Continued

QUICK TURN WITH STRUT #1 M=.5

MODEL DATA PAGE 6

126		2.0360E 01	3.3000E-01	6.7000E-01	2.2060E 01	3.3000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.1950E 01	3.3000E-01	1.9200E 00	2.0300E 01	3.3000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
127		2.0300E 01	3.3000E-01	1.9200E 00	2.1950E 01	3.3000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.1830E 01	3.3000E-01	3.7000E 00	2.0220E 01	3.3000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
128		2.0220E 01	3.3000E-01	3.7000E 00	2.1830E 01	3.3000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.1700E 01	3.3000E-01	5.7700E 00	2.0170E 01	3.3000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
129		2.0170E 01	3.3000E-01	5.7700E 00	2.1700E 01	3.3000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.1540E 01	3.3000E-01	8.0000E 00	2.0080E 01	3.3000E-01	8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
130		2.2060E 01	3.3000E-01	6.7000E-01	2.3970E 01	3.3000E-01	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3830E 01	3.3000E-01	1.9200E 00	2.1950E 01	3.3000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
131		2.1950E 01	3.3000E-01	1.9200E 00	2.3830E 01	3.3000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3630E 01	3.3000E-01	3.7000E 00	2.1830E 01	3.3000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
132		2.1830E 01	3.3000E-01	3.7000E 00	2.3630E 01	3.3000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3400E 01	3.3000E-01	5.7700E 00	2.1700E 01	3.3000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
133		2.1700E 01	3.3000E-01	5.7700E 00	2.3400E 01	3.3000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3160E 01	3.3000E-01	8.0000E 00	2.1540E 01	3.3000E-01	8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
134		2.3970E 01	3.3000E-01	6.7000E-01	2.6370E 01	0.0	6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.6220E 01	0.0	1.9200E 00	2.3830E 01	3.3000E-01	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
135		2.3830E 01	3.3000E-01	1.9200E 00	2.6220E 01	0.0	1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.6040E 01	0.0	3.7000E 00	2.3630E 01	3.3000E-01	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
136		2.3630E 01	3.3000E-01	3.7000E 00	2.6040E 01	0.0	3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.5820E 01	0.0	5.7700E 00	2.3400E 01	3.3000E-01	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
137		2.3400E 01	3.3000E-01	5.7700E 00	2.5820E 01	0.0	5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.5580E 01	0.0	8.0000E 00	2.3160E 01	3.3000E-01	8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
138		1.2850E 01	0.0	0.0	1.3750E 01	3.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3750E 01	3.6000E-01	-1.0000E-01	1.2850E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
139		1.2850E 01	0.0	0.0	1.3750E 01	3.6000E-01	-1.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3750E 01	2.6000E-01	-2.6000E-01	1.2850E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
140		1.2850E 01	0.0	0.0	1.3750E 01	2.6000E-01	-2.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3750E 01	1.0000E-01	-3.6000E-01	1.2850E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
141		1.2850E 01	0.0	0.0	1.3750E 01	1.0000E-01	-3.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.3750E 01	0.0	-3.7000E-01	1.2850E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
142		1.3750E 01	3.7000E-01	0.0	1.4270E 01	5.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4270E 01	5.4000E-01	-1.4000E-01	1.3750E 01	3.6000E-01	-1.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
143		1.3750E 01	3.6000E-01	-1.0000E-01	1.4270E 01	5.4000E-01	-1.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4270E 01	4.1000E-01	-4.1000E-01	1.3750E 01	2.6000E-01	-2.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
144		1.3750E 01	2.6000E-01	-2.6000E-01	1.4270E 01	4.1000E-01	-4.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4270E 01	1.4000E-01	-5.4000E-01	1.3750E 01	1.0000E-01	-3.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
145		1.3750E 01	1.0000E-01	-3.6000E-01	1.4270E 01	1.4000E-01	-5.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4270E 01	0.0	-5.7000E-01	1.3750E 01	0.0	-3.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
146		1.4270E 01	5.7000E-01	0.0	1.4850E 01	8.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4850E 01	7.7000E-01	-2.1000E-01	1.4270E 01	5.4000E-01	-1.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
147		1.4270E 01	5.4000E-01	-1.4000E-01	1.4850E 01	7.7000E-01	-2.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4850E 01	5.6000E-01	-5.6000E-01	1.4270E 01	4.1000E-01	-4.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
148		1.4270E 01	4.1000E-01	-4.1000E-01	1.4850E 01	5.6000E-01	-5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4850E 01	2.1000E-01	-7.7000E-01	1.4270E 01	1.4000E-01	-5.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
149		1.4270E 01	1.4000E-01	-5.4000E-01	1.4850E 01	2.1000E-01	-7.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.4850E 01	0.0	-8.0000E-01	1.4270E 01	0.0	-5.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
150		1.4850E 01	8.0000E-01	0.0	1.5900E 01	8.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.5900E 01	7.7000E-01	-2.1000E-01	1.4850E 01	7.7000E-01	-2.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50

Table B-2. Continued

QUICK TURN WITH STRUT #1 M=.5
MODEL DATA PAGE 7

151		1.4850E 01	7.7000E-01	-2.1000E-01	1.5900E 01	7.7000E-01	-2.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.5900E 01	5.6000E-01	-5.6000E-01	1.4850E 01	5.6000E-01	-5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
152		1.4850E 01	5.6000E-01	-5.6000E-01	1.5900E 01	5.6000E-01	-5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.5900E 01	2.1000E-01	-7.7000E-01	1.4850E 01	2.1000E-01	-7.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
153		1.4850E 01	2.1000E-01	-7.7000E-01	1.5900E 01	2.1000E-01	-7.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.5900E 01	0.0	-8.0000E-01	1.4850E 01	0.0	-8.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
154		1.5900E 01	8.0000E-01	0.0	1.6030E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.6030E 01	6.4000E-01	-1.7000E-01	1.5900E 01	7.7000E-01	-2.1000E-01	1.0000E 50	1.0000E 50	1.0000E 50
155		1.5900E 01	7.7000E-01	-2.1000E-01	1.6030E 01	6.4000E-01	-1.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.6030E 01	4.8000E-01	-4.8000E-01	1.5900E 01	5.6000E-01	-5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
156		1.5900E 01	5.6000E-01	-5.6000E-01	1.6030E 01	4.8000E-01	-4.8000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.6030E 01	1.7000E-01	-6.4000E-01	1.5900E 01	2.1000E-01	-7.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
157		1.5900E 01	2.1000E-01	-7.7000E-01	1.6030E 01	1.7000E-01	-6.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.6030E 01	0.0	-6.7000E-01	1.5900E 01	0.0	-8.0000E-01	1.0000E 50	1.0000E 50	1.0000E 50
158		1.6030E 01	6.7000E-01	0.0	1.7300E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.7300E 01	6.7000E-01	-4.5000E-01	1.6030E 01	6.4000E-01	-1.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
159		1.6030E 01	6.4000E-01	-1.7000E-01	1.7300E 01	6.7000E-01	-4.5000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.7300E 01	6.7000E-01	-4.5000E-01	1.6030E 01	4.8000E-01	-4.8000E-01	1.0000E 50	1.0000E 50	1.0000E 50
160		1.6030E 01	4.8000E-01	-4.8000E-01	1.7300E 01	6.7000E-01	-4.5000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.7300E 01	4.5000E-01	-6.7000E-01	1.6030E 01	1.7000E-01	-6.4000E-01	1.0000E 50	1.0000E 50	1.0000E 50
161		1.6030E 01	1.7000E-01	-6.4000E-01	1.7300E 01	4.5000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.7300E 01	0.0	-6.7000E-01	1.6030E 01	0.0	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
162		1.7300E 01	4.5000E-01	-6.7000E-01	1.8000E 01	0.0	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8000E 01	0.0	-6.7000E-01	1.7300E 01	0.0	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
163		1.7300E 01	6.7000E-01	0.0	1.8300E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	6.7000E-01	-5.6000E-01	1.7300E 01	6.7000E-01	-4.5000E-01	1.0000E 50	1.0000E 50	1.0000E 50
164		1.7300E 01	6.7000E-01	-4.5000E-01	1.8300E 01	6.7000E-01	-5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	5.6000E-01	-6.7000E-01	1.7300E 01	4.5000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
165		1.7300E 01	4.5000E-01	-6.7000E-01	1.8300E 01	5.6000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	-6.7000E-01	1.8000E 01	0.0	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
166		1.8300E 01	6.7000E-01	0.0	1.9040E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	6.7000E-01	-6.7000E-01	1.8300E 01	6.7000E-01	-5.6000E-01	1.0000E 50	1.0000E 50	1.0000E 50
167		1.8300E 01	6.7000E-01	-5.6000E-01	1.9040E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	6.7000E-01	-6.7000E-01	1.8300E 01	5.6000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
168		1.8300E 01	5.6000E-01	-6.7000E-01	1.9040E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	-6.7000E-01	1.8300E 01	2.0000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
169		1.9040E 01	6.7000E-01	0.0	2.0500E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0500E 01	6.7000E-01	-6.7000E-01	1.9040E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
170		1.9040E 01	6.7000E-01	-6.7000E-01	2.0500E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0360E 01	3.3000E-01	-6.7000E-01	1.9040E 01	3.3000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
171		2.0500E 01	6.7000E-01	0.0	2.2300E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.2300E 01	6.7000E-01	-6.7000E-01	2.0500E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
172		2.0500E 01	6.7000E-01	-6.7000E-01	2.2300E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.2060E 01	3.3000E-01	-6.7000E-01	2.0360E 01	3.3000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
173		2.2300E 01	6.7000E-01	0.0	2.4500E 01	6.7000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.4500E 01	6.7000E-01	-6.7000E-01	2.2300E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
174		2.2300E 01	6.7000E-01	-6.7000E-01	2.4500E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3970E 01	3.3000E-01	-6.7000E-01	2.2060E 01	3.3000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
175		2.4500E 01	6.7000E-01	0.0	2.6370E 01	3.0000E-01	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.6370E 01	3.0000E-01	-6.7000E-01	2.4500E 01	6.7000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50

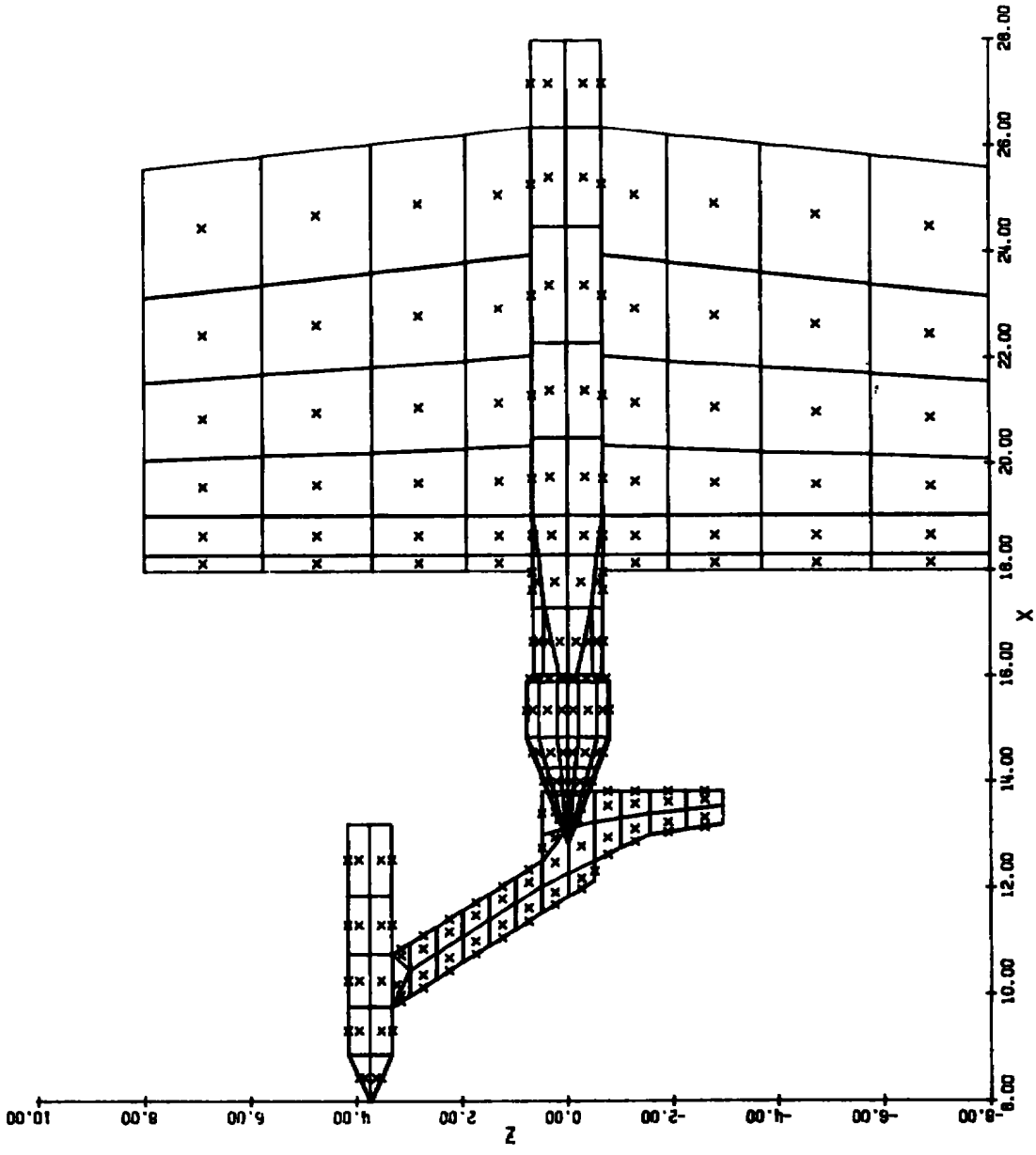
Table B-2. Continued

QUICK TURN WITH STRUT #1 M=.5

MODEL	DATA									
PAGE 8										
176		2.4500E 01	6.7000E-01	-6.7000E-01	2.6370E 01	3.0000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.6370E 01	0.0	-6.7000E-01	2.3970E 01	3.3000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
177		2.6370E 01	3.0000E-01	0.0	2.8000E 01	0.0	0.0	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.8000E 01	0.0	-6.7000E-01	2.6370E 01	3.0000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
178		2.6370E 01	3.0000E-01	-6.7000E-01	2.8000E 01	0.0	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.8000E 01	0.0	-6.7000E-01	2.6370E 01	0.0	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
179		1.8000E 01	0.0	-6.7000E-01	1.8300E 01	2.0000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	-1.9200E 00	1.8000E 01	0.0	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
180		1.8000E 01	0.0	-1.9200E 00	1.8300E 01	2.0000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	-3.7000E 00	1.8000E 01	0.0	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
181		1.8000E 01	0.0	-3.7000E 00	1.8300E 01	2.0000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	-5.7700E 00	1.8000E 01	0.0	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
182		1.8000E 01	0.0	-5.7700E 00	1.8300E 01	2.0000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.8300E 01	2.0000E-01	-8.0000E 00	1.8000E 01	0.0	-8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
183		1.8300E 01	2.0000E-01	-6.7000E-01	1.9040E 01	3.3000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	-1.9200E 00	1.8300E 01	2.0000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
184		1.8300E 01	2.0000E-01	-1.9200E 00	1.9040E 01	3.3000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	-3.7000E 00	1.8300E 01	2.0000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
185		1.8300E 01	2.0000E-01	-3.7000E 00	1.9040E 01	3.3000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	-5.7700E 00	1.8300E 01	2.0000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
186		1.8300E 01	2.0000E-01	-5.7700E 00	1.9040E 01	3.3000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	1.9040E 01	3.3000E-01	-8.0000E 00	1.8300E 01	2.0000E-01	-8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
187		1.9040E 01	3.3000E-01	-6.7000E-01	2.0360E 01	3.3000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0300E 01	3.3000E-01	-1.9200E 00	1.9040E 01	3.3000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
188		1.9040E 01	3.3000E-01	-1.9200E 00	2.0300E 01	3.3000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0220E 01	3.3000E-01	-3.7000E 00	1.9040E 01	3.3000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
189		1.9040E 01	3.3000E-01	-3.7000E 00	2.0220E 01	3.3000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0170E 01	3.3000E-01	-5.7700E 00	1.9040E 01	3.3000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
190		1.9040E 01	3.3000E-01	-5.7700E 00	2.0170E 01	3.3000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.0080E 01	3.3000E-01	-8.0000E 00	1.9040E 01	3.3000E-01	-8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
191		2.0360E 01	3.3000E-01	-6.7000E-01	2.2060E 01	3.3000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.1950E 01	3.3000E-01	-1.9200E 00	2.0300E 01	3.3000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
192		2.0300E 01	3.3000E-01	-1.9200E 00	2.1950E 01	3.3000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.1830E 01	3.3000E-01	-3.7000E 00	2.0220E 01	3.3000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
193		2.0220E 01	3.3000E-01	-3.7000E 00	2.1830E 01	3.3000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.1700E 01	3.3000E-01	-5.7700E 00	2.0170E 01	3.3000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
194		2.0170E 01	3.3000E-01	-5.7700E 00	2.1700E 01	3.3000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.1540E 01	3.3000E-01	-8.0000E 00	2.0080E 01	3.3000E-01	-8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
195		2.2060E 01	3.3000E-01	-6.7000E-01	2.3970E 01	3.3000E-01	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3830E 01	3.3000E-01	-1.9200E 00	2.1950E 01	3.3000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
196		2.1950E 01	3.3000E-01	-1.9200E 00	2.3830E 01	3.3000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3630E 01	3.3000E-01	-3.7000E 00	2.1830E 01	3.3000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
197		2.1830E 01	3.3000E-01	-3.7000E 00	2.3630E 01	3.3000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3400E 01	3.3000E-01	-5.7700E 00	2.1700E 01	3.3000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
198		2.1700E 01	3.3000E-01	-5.7700E 00	2.3400E 01	3.3000E-01	-5.7700E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.3160E 01	3.3000E-01	-8.0000E 00	2.1540E 01	3.3000E-01	-8.0000E 00	1.0000E 50	1.0000E 50	1.0000E 50
199		2.3970E 01	3.3000E-01	-6.7000E-01	2.6370E 01	0.0	-6.7000E-01	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.6220E 01	0.0	-1.9200E 00	2.3830E 01	3.3000E-01	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
200		2.3830E 01	3.3000E-01	-1.9200E 00	2.6220E 01	0.0	-1.9200E 00	1.0000E 50	1.0000E 50	1.0000E 50
	2	2.6040E 01	0.0	-3.7000E 00	2.3630E 01	3.3000E-01	-3.7000E 00	1.0000E 50	1.0000E 50	1.0000E 50

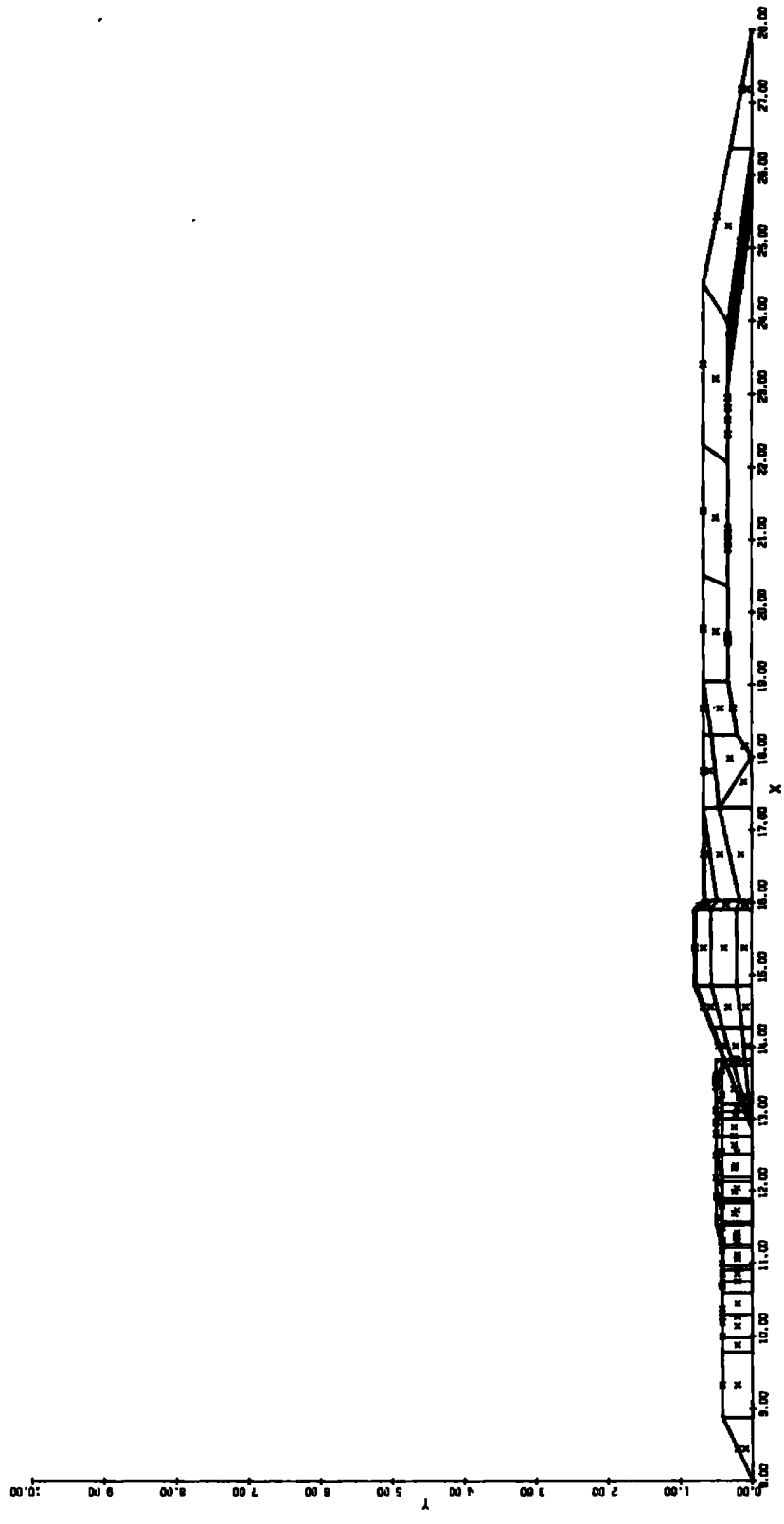
Table B-2. Concluded

```
QUICK TURN WITH STRUT #1      M=.5
MODEL DATA     PAGE   9
  201     2.3630E 01  3.3000E-01 -3.7000E 00   2.6040E 01  0.0         -3.7000E 00     1.0000E 50  1.0000E 50  1.0000E 50
      2   2.5820E 01  0.0         -5.7700E 00   2.3400E 01  3.3000E-01 -5.7700E 00     1.0000E 50  1.0000E 50  1.0000E 50
  202     2.3400E 01  3.3000E-01 -5.7700E 00   2.5820E 01  0.0         -5.7700E 00     1.0000E 50  1.0000E 50  1.0000E 50
      2   2.5580E 01  0.0         -8.0000E 00   2.3160E 01  3.3000E-01 -8.0000E 00     1.0000E 50  1.0000E 50  1.0000E 50
```

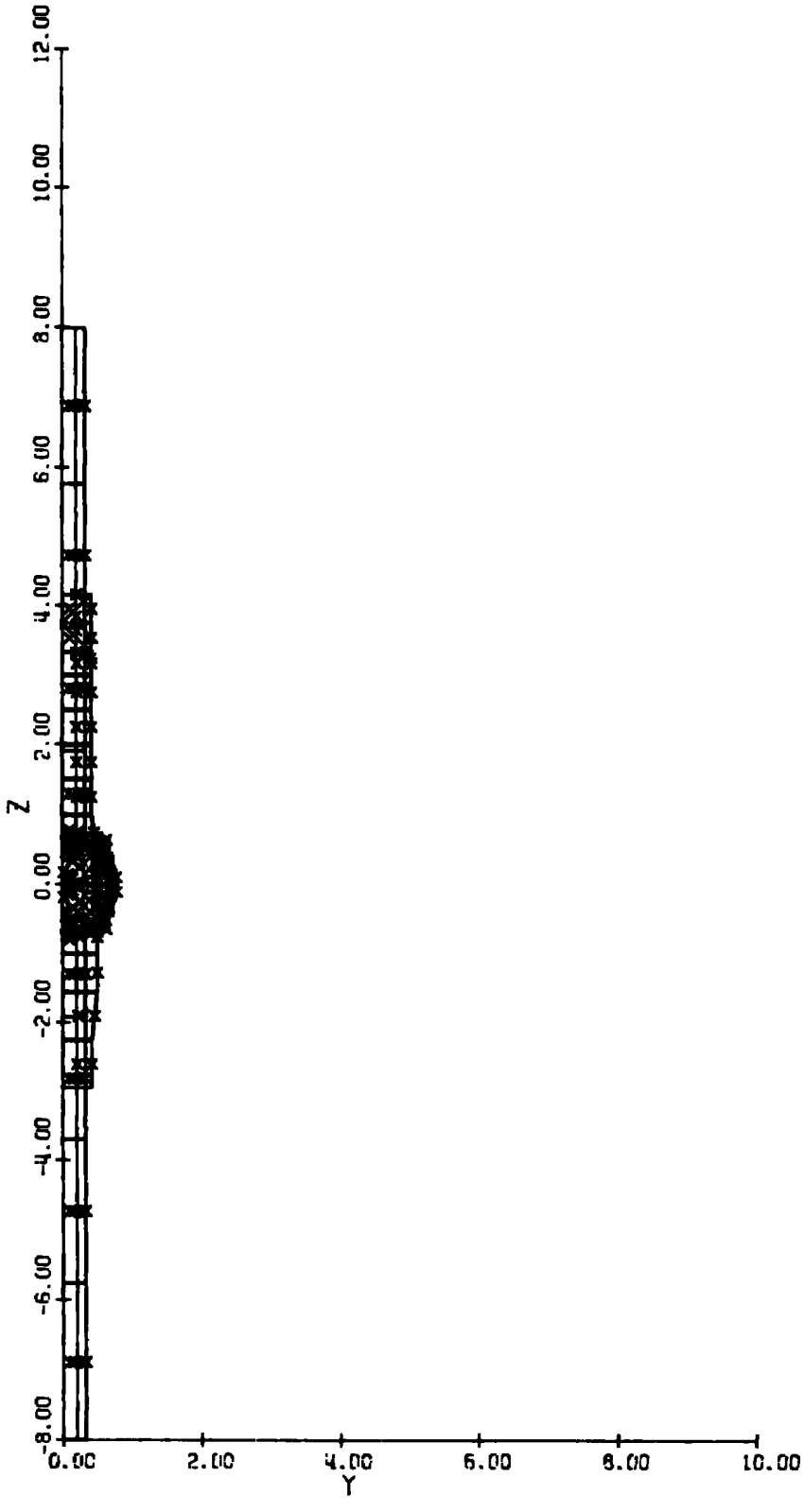


a. Side view

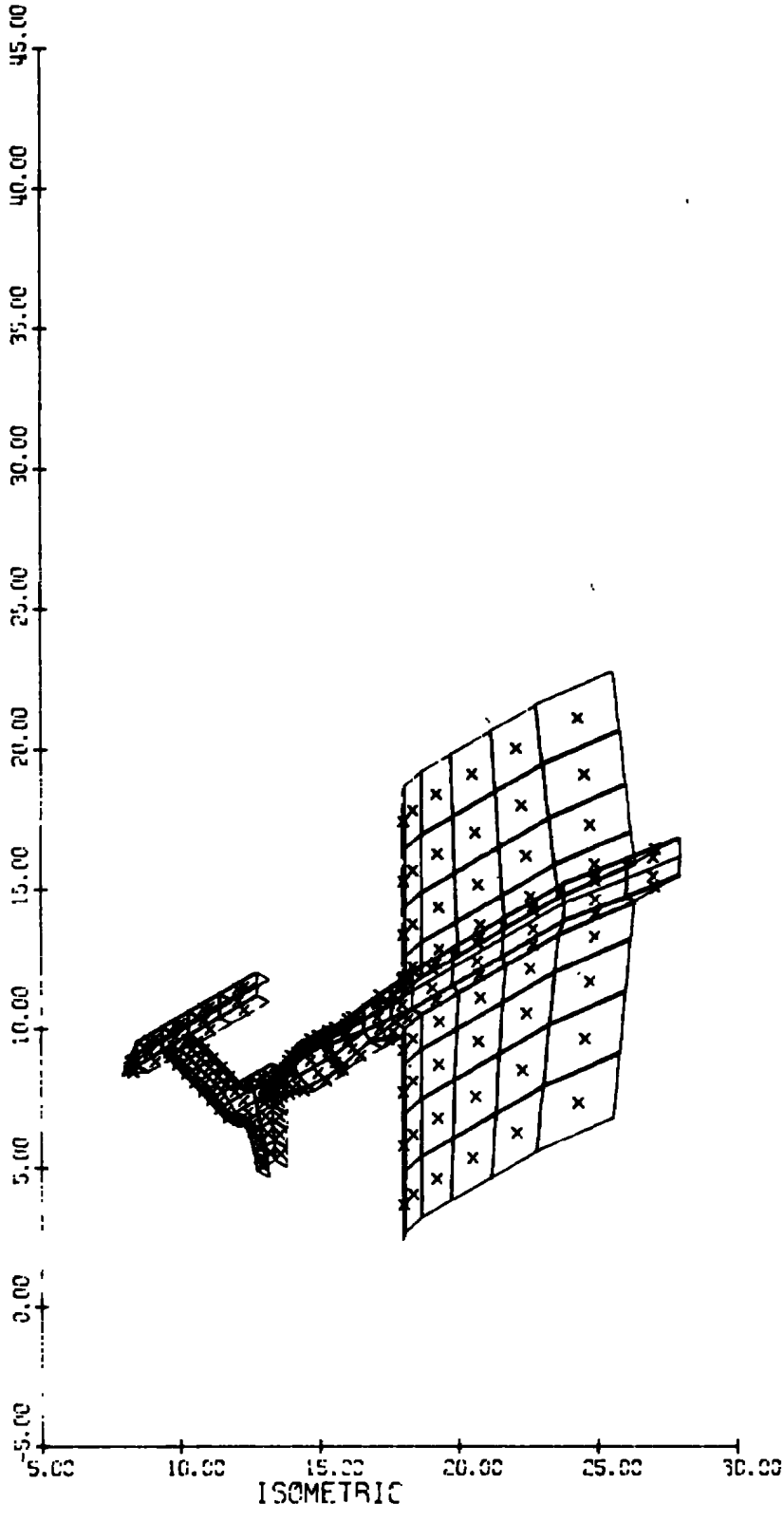
Figure B-1. Mathematical model for sample problem (sting-strut configuration).



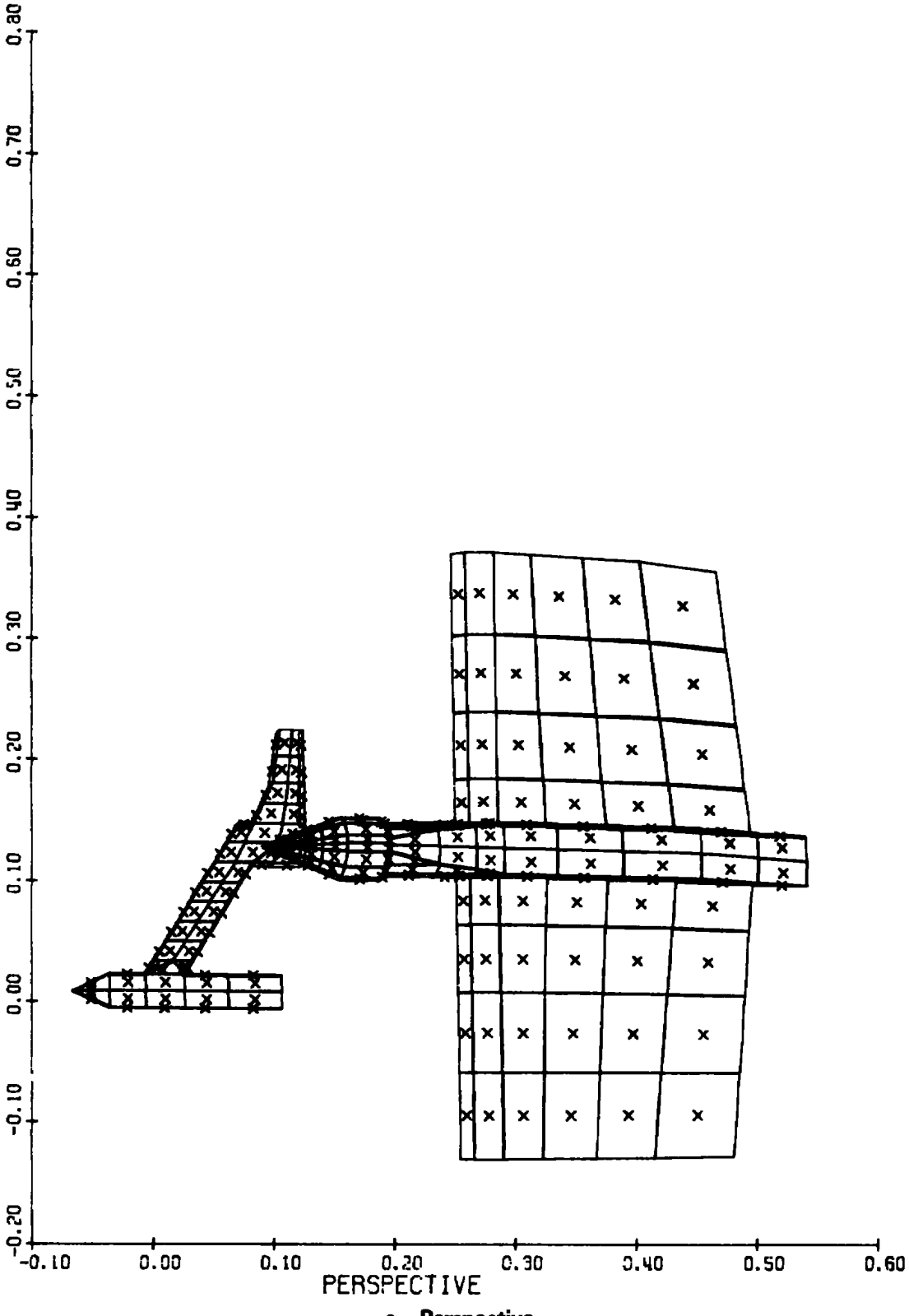
b. Top view
Figure B-1. Continued.



c. Front view
Figure B-1. Continued.



d. Isometric view
Figure B-1. Continued.



e. Perspective

Figure B-1. Concluded.

Table B-3. Input Data for PFP

```
      LX          LY          LZ
       0           1           0

    AX              AY              AZ              PROX
  0.0             9.000000E 01    9.000000E 01    0.0

    FX              FY              FZ              FS              MI              K
  0.0             9.000000E 01    9.000000E 01    1.000000E 00    5.000000E-01    1.400000E 00

      NW        MDIM        NDIM        NEED
     202       12374       15000        4041

    PS              CA              M**2            BETA            1/BETA
  0.0             1.999998E-01    2.500000E-01    8.660254E-01    1.154700E 00

    TRAIL VECTOR                                    E
  1.0000000E 00   0.0             0.0             0.0

    BODY - WIND TRANSFORMATION MATRIX               E
  1.0000000E 00   0.0             0.0             0.0
  0.0             1.0000000E 00   0.0             0.0
  0.0             0.0             1.0000000E 00   0.0

BODY STRETCHED

SYSTEM STARTED

SYSTEM COMPUTED

SOLUTION STARTED

      JU1         JU2         MM2         N2
       91          92          30         203
       92          91          30         173
       91          92          30         143
       92          91          30         113
       91          92          60          83
       92          91          60          23
       91          92         180           1

SYSTEM SOLVED

RELATIVE ERROR OF SOLUTION  2.65E-04
```

Table B-4. Velocity Data Tabulation

QUICK TURN WITH STRUT #1 M=.5
VELOCITIES PAGE 1

X	Y	Z	U	V	W	|V|	M	A(V,U)	A(W,U)	CP	P-MI
5.0000E 00	0.0	2.0000E 00	0.98844	0.0	-0.00074	0.98844	0.49394	0.0	-0.04	2.299E-02	-6.063E-03
5.0000E 00	5.0000E-01	2.0000E 00	0.98861	0.00106	-0.00070	0.98862	0.49403	0.06	-0.04	2.264E-02	-5.972E-03
5.0000E 00	1.0000E 00	2.0000E 00	0.98911	0.00203	-0.00061	0.98911	0.49429	0.12	-0.04	2.166E-02	-5.711E-03
5.0000E 00	1.5000E 00	2.0000E 00	0.98986	0.00283	-0.00048	0.98986	0.49468	0.16	-0.03	2.017E-02	-5.319E-03
5.0000E 00	2.0000E 00	2.0000E 00	0.99076	0.00344	-0.00032	0.99077	0.49516	0.20	-0.02	1.836E-02	-4.842E-03
5.0000E 00	2.5000E 00	2.0000E 00	0.99174	0.00384	-0.00017	0.99175	0.49567	0.22	-0.01	1.644E-02	-4.330E-03
5.0000E 00	3.0000E 00	2.0000E 00	0.99271	0.00407	-0.00003	0.99272	0.49618	0.23	-0.00	1.450E-02	-3.819E-03
5.0000E 00	0.0	2.5000E 00	0.98803	0.0	0.00002	0.98803	0.49372	0.0	0.00	2.380E-02	-6.280E-03
5.0000E 00	5.0000E-01	2.5000E 00	0.98822	0.00112	0.00004	0.98822	0.49382	0.06	0.00	2.342E-02	-6.178E-03
5.0000E 00	1.0000E 00	2.5000E 00	0.98877	0.00213	0.00010	0.98877	0.49411	0.12	0.01	2.232E-02	-5.888E-03
5.0000E 00	1.5000E 00	2.5000E 00	0.98960	0.00296	0.00020	0.98960	0.49454	0.17	0.01	2.069E-02	-5.455E-03
5.0000E 00	2.0000E 00	2.5000E 00	0.99058	0.00357	0.00030	0.99059	0.49506	0.21	0.02	1.873E-02	-4.936E-03
5.0000E 00	2.5000E 00	2.5000E 00	0.99163	0.00396	0.00039	0.99164	0.49562	0.23	0.02	1.664E-02	-4.385E-03
5.0000E 00	3.0000E 00	2.5000E 00	0.99267	0.00416	0.00046	0.99268	0.49616	0.24	0.03	1.459E-02	-3.843E-03
5.0000E 00	0.0	3.0000E 00	0.98786	0.0	0.00089	0.98786	0.49363	0.0	0.05	2.413E-02	-6.368E-03
5.0000E 00	5.0000E-01	3.0000E 00	0.98807	0.00115	0.00090	0.98807	0.49374	0.07	0.05	2.372E-02	-6.258E-03
5.0000E 00	1.0000E 00	3.0000E 00	0.98866	0.00219	0.00093	0.98866	0.49405	0.13	0.05	2.255E-02	-5.948E-03
5.0000E 00	1.5000E 00	3.0000E 00	0.98953	0.00302	0.00096	0.98954	0.49451	0.18	0.06	2.081E-02	-5.487E-03
5.0000E 00	2.0000E 00	3.0000E 00	0.99058	0.00363	0.00098	0.99058	0.49506	0.21	0.06	1.875E-02	-4.940E-03
5.0000E 00	2.5000E 00	3.0000E 00	0.99167	0.00401	0.00099	0.99168	0.49563	0.23	0.06	1.657E-02	-4.366E-03
5.0000E 00	3.0000E 00	3.0000E 00	0.99273	0.00419	0.00099	0.99274	0.49619	0.24	0.06	1.446E-02	-3.807E-03
5.0000E 00	0.0	3.5000E 00	0.98802	0.0	0.00184	0.98802	0.49372	0.0	0.11	2.382E-02	-6.285E-03
5.0000E 00	5.0000E-01	3.5000E 00	0.98823	0.00115	0.00183	0.98823	0.49383	0.07	0.11	2.340E-02	-6.172E-03
5.0000E 00	1.0000E 00	3.5000E 00	0.98883	0.00218	0.00180	0.98884	0.49414	0.13	0.10	2.220E-02	-5.856E-03
5.0000E 00	1.5000E 00	3.5000E 00	0.98972	0.00301	0.00175	0.98973	0.49461	0.17	0.10	2.044E-02	-5.389E-03
5.0000E 00	2.0000E 00	3.5000E 00	0.99077	0.00360	0.00169	0.99078	0.49516	0.21	0.10	1.835E-02	-4.837E-03
5.0000E 00	2.5000E 00	3.5000E 00	0.99187	0.00397	0.00161	0.99188	0.49574	0.23	0.09	1.618E-02	-4.261E-03
5.0000E 00	3.0000E 00	3.5000E 00	0.99293	0.00414	0.00152	0.99294	0.49630	0.24	0.09	1.407E-02	-3.705E-03
5.0000E 00	0.0	4.0000E 00	0.98853	0.0	0.00275	0.98853	0.49399	0.0	0.16	2.286E-02	-6.014E-03
5.0000E 00	5.0000E-01	4.0000E 00	0.98874	0.00111	0.00272	0.98874	0.49409	0.06	0.16	2.239E-02	-5.905E-03
5.0000E 00	1.0000E 00	4.0000E 00	0.98932	0.00211	0.00264	0.98932	0.49440	0.12	0.15	2.124E-02	-5.601E-03
5.0000E 00	1.5000E 00	4.0000E 00	0.99017	0.00291	0.00252	0.99018	0.49485	0.17	0.15	1.954E-02	-5.151E-03
5.0000E 00	2.0000E 00	4.0000E 00	0.99118	0.00348	0.00237	0.99119	0.49538	0.20	0.14	1.754E-02	-4.621E-03
5.0000E 00	2.5000E 00	4.0000E 00	0.99224	0.00383	0.00220	0.99225	0.49593	0.22	0.13	1.545E-02	-4.068E-03
5.0000E 00	3.0000E 00	4.0000E 00	0.99325	0.00400	0.00202	0.99326	0.49646	0.23	0.12	1.343E-02	-3.537E-03
5.0000E 00	0.0	4.5000E 00	0.98937	0.0	0.00353	0.98938	0.49443	0.0	0.20	2.113E-02	-5.573E-03
5.0000E 00	5.0000E-01	4.5000E 00	0.98956	0.00104	0.00348	0.98956	0.49453	0.06	0.20	2.076E-02	-5.475E-03
5.0000E 00	1.0000E 00	4.5000E 00	0.99009	0.00198	0.00336	0.99009	0.49480	0.11	0.19	1.972E-02	-5.197E-03
5.0000E 00	1.5000E 00	4.5000E 00	0.99086	0.00274	0.00318	0.99087	0.49521	0.16	0.18	1.817E-02	-4.788E-03
5.0000E 00	2.0000E 00	4.5000E 00	0.99179	0.00328	0.00295	0.99180	0.49570	0.19	0.17	1.634E-02	-4.304E-03
5.0000E 00	2.5000E 00	4.5000E 00	0.99275	0.00362	0.00270	0.99276	0.49620	0.21	0.16	1.443E-02	-3.798E-03
5.0000E 00	3.0000E 00	4.5000E 00	0.99368	0.00378	0.00245	0.99369	0.49669	0.22	0.14	1.257E-02	-3.310E-03
5.0000E 00	0.0	5.0000E 00	0.99044	0.0	0.00410	0.99045	0.49499	0.0	0.24	1.901E-02	-5.010E-03
5.0000E 00	5.0000E-01	5.0000E 00	0.99060	0.00095	0.00405	0.99061	0.49507	0.05	0.23	1.869E-02	-4.926E-03
5.0000E 00	1.0000E 00	5.0000E 00	0.99105	0.00180	0.00390	0.99106	0.49531	0.10	0.23	1.779E-02	-4.688E-03
5.0000E 00	1.5000E 00	5.0000E 00	0.99173	0.00250	0.00367	0.99174	0.49567	0.14	0.21	1.645E-02	-4.335E-03
5.0000E 00	2.0000E 00	5.0000E 00	0.99253	0.00301	0.00339	0.99254	0.49609	0.17	0.20	1.486E-02	-3.914E-03
5.0000E 00	2.5000E 00	5.0000E 00	0.99337	0.00334	0.00309	0.99338	0.49653	0.19	0.18	1.319E-02	-3.471E-03
5.0000E 00	3.0000E 00	5.0000E 00	0.99420	0.00351	0.00279	0.99421	0.49696	0.20	0.16	1.155E-02	-3.040E-03
5.0000E 00	0.0	5.5000E 00	0.99162	0.0	0.00444	0.99163	0.49561	0.0	0.26	1.667E-02	-4.390E-03

Table B-4. Continued

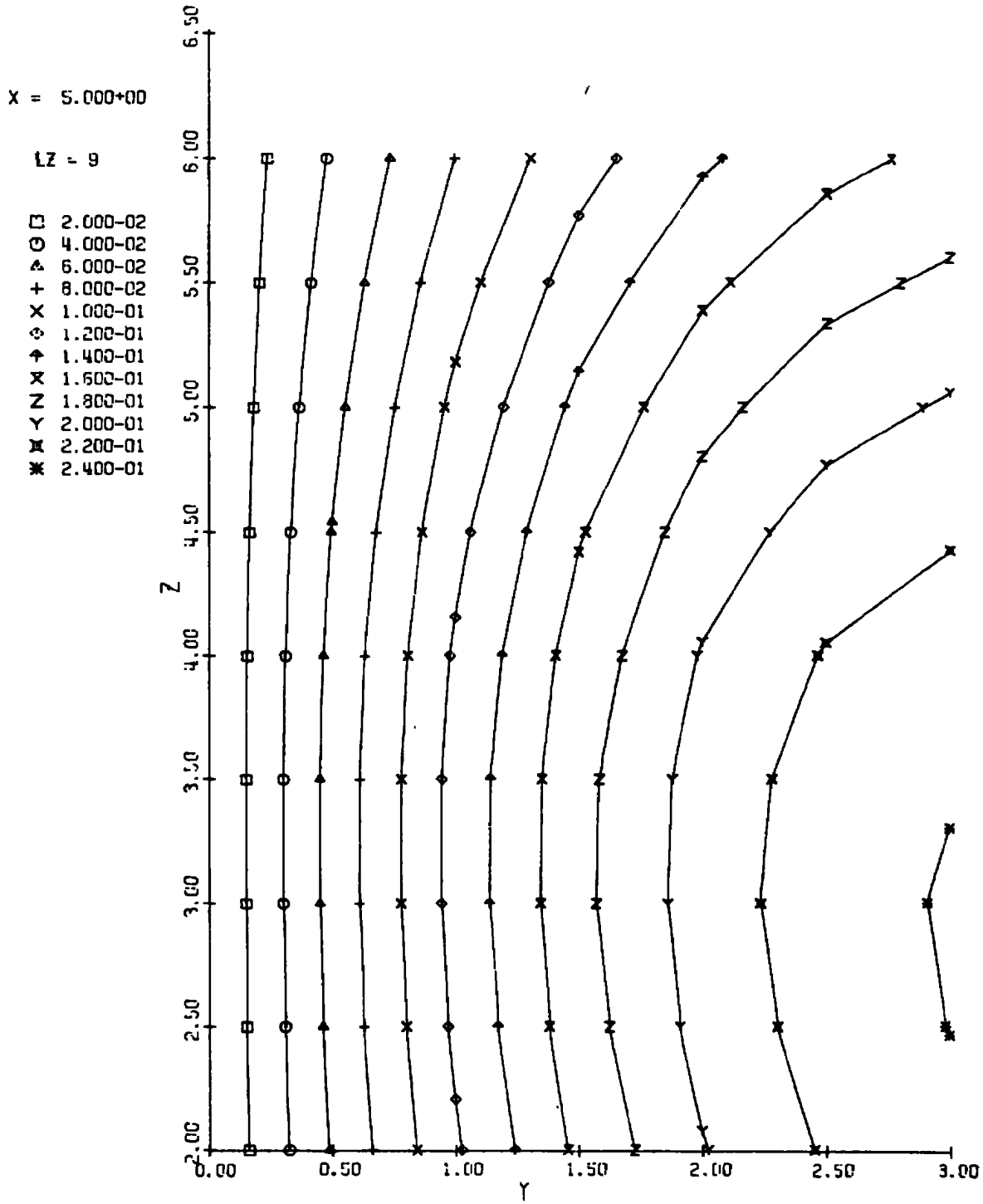
QUICK TURN WITH STRUT #1 M=.5
VELOCITIES PAGE 2

X	Y	Z	U	V	W	|V|	M	A(V,U)	A(W,U)	CP	P-MI
5.0000E 00	5.0000E-01	5.5000E 00	0.99175	0.00084	0.00438	0.99176	0.49568	0.05	0.25	1.641E-02	-4.322E-03
5.0000E 00	1.0000E 00	5.5000E 00	0.99212	0.00160	0.00422	0.99213	0.49587	0.09	0.24	1.567E-02	-4.127E-03
5.0000E 00	1.5000E 00	5.5000E 00	0.99268	0.00223	0.00397	0.99269	0.49616	0.13	0.23	1.457E-02	-3.836E-03
5.0000E 00	2.0000E 00	5.5000E 00	0.99335	0.00270	0.00367	0.99336	0.49651	0.16	0.21	1.324E-02	-3.486E-03
5.0000E 00	2.5000E 00	5.5000E 00	0.99406	0.00302	0.00334	0.99407	0.49689	0.17	0.19	1.183E-02	-3.114E-03
5.0000E 00	3.0000E 00	5.5000E 00	0.99476	0.00320	0.00302	0.99477	0.49725	0.18	0.17	1.044E-02	-2.747E-03
5.0000E 00	0.0	6.0000E 00	0.99280	0.0	0.00455	0.99281	0.49623	0.0	0.26	1.433E-02	-3.774E-03
5.0000E 00	5.0000E-01	6.0000E 00	0.99290	0.00073	0.00450	0.99291	0.49628	0.04	0.26	1.413E-02	-3.721E-03
5.0000E 00	1.0000E 00	6.0000E 00	0.99315	0.00139	0.00434	0.99320	0.49643	0.08	0.25	1.355E-02	-3.568E-03
5.0000E 00	1.5000E 00	6.0000E 00	0.99363	0.00195	0.00409	0.99364	0.49666	0.11	0.24	1.268E-02	-3.336E-03
5.0000E 00	2.0000E 00	6.0000E 00	0.99417	0.00238	0.00379	0.99418	0.49694	0.14	0.22	1.161E-02	-3.056E-03
5.0000E 00	2.5000E 00	6.0000E 00	0.99475	0.00268	0.00347	0.99476	0.49725	0.15	0.20	1.046E-02	-2.752E-03
5.0000E 00	3.0000E 00	6.0000E 00	0.99532	0.00287	0.00314	0.99533	0.49755	0.16	0.18	9.312E-03	-2.449E-03
7.0000E 00	0.0	2.0000E 00	0.97045	0.0	-0.00933	0.97050	0.48455	0.0	-0.55	5.813E-02	-1.545E-02
7.0000E 00	5.0000E-01	2.0000E 00	0.97177	0.00528	-0.00863	0.97183	0.48524	0.31	-0.51	5.555E-02	-1.476E-02
7.0000E 00	1.0000E 00	2.0000E 00	0.97517	0.00922	-0.00688	0.97524	0.48703	0.54	-0.40	4.891E-02	-1.297E-02
7.0000E 00	1.5000E 00	2.0000E 00	0.97946	0.01134	-0.00480	0.97954	0.48927	0.66	-0.28	4.051E-02	-1.073E-02
7.0000E 00	2.0000E 00	2.0000E 00	0.98363	0.01194	-0.00297	0.98371	0.49146	0.70	-0.17	3.232E-02	-8.544E-03
7.0000E 00	2.5000E 00	2.0000E 00	0.98720	0.01158	-0.00159	0.98727	0.49332	0.67	-0.09	2.531E-02	-6.679E-03
7.0000E 00	3.0000E 00	2.0000E 00	0.99005	0.01075	-0.00065	0.99011	0.49481	0.62	-0.04	1.968E-02	-5.189E-03
7.0000E 00	0.0	2.5000E 00	0.96380	0.0	-0.00856	0.96384	0.48107	0.0	-0.51	7.101E-02	-1.893E-02
7.0000E 00	5.0000E-01	2.5000E 00	0.96590	0.00678	-0.00769	0.96595	0.48217	0.40	-0.46	6.694E-02	-1.783E-02
7.0000E 00	1.0000E 00	2.5000E 00	0.97106	0.01144	-0.00560	0.97115	0.48488	0.68	-0.33	5.688E-02	-1.512E-02
7.0000E 00	1.5000E 00	2.5000E 00	0.97711	0.01344	-0.00332	0.97721	0.48806	0.79	-0.19	4.506E-02	-1.194E-02
7.0000E 00	2.0000E 00	2.5000E 00	0.98253	0.01353	-0.00149	0.98262	0.49089	0.79	-0.09	3.445E-02	-9.112E-03
7.0000E 00	2.5000E 00	2.5000E 00	0.98681	0.01264	-0.00027	0.98689	0.49312	0.73	-0.02	2.605E-02	-6.876E-03
7.0000E 00	3.0000E 00	2.5000E 00	0.99002	0.01140	0.00045	0.99009	0.49480	0.66	0.03	1.973E-02	-5.201E-03
7.0000E 00	0.0	3.0000E 00	0.95645	0.0	-0.00491	0.95650	0.47724	0.0	-0.29	8.511E-02	-2.276E-02
7.0000E 00	5.0000E-01	3.0000E 00	0.95962	0.00840	-0.00412	0.95967	0.47889	0.50	-0.25	7.904E-02	-2.111E-02
7.0000E 00	1.0000E 00	3.0000E 00	0.96704	0.01367	-0.00232	0.96714	0.48279	0.81	-0.14	6.464E-02	-1.721E-02
7.0000E 00	1.5000E 00	3.0000E 00	0.97514	0.01536	-0.00051	0.97526	0.48704	0.90	-0.03	4.886E-02	-1.296E-02
7.0000E 00	2.0000E 00	3.0000E 00	0.98184	0.01482	0.00076	0.98195	0.49054	0.86	0.04	3.578E-02	-9.464E-03
7.0000E 00	2.5000E 00	3.0000E 00	0.98675	0.01338	0.00147	0.98684	0.49310	0.78	0.09	2.614E-02	-6.901E-03
7.0000E 00	3.0000E 00	3.0000E 00	0.99022	0.01175	0.00177	0.99029	0.49491	0.68	0.10	1.932E-02	-5.092E-03
7.0000E 00	0.0	3.5000E 00	0.95212	0.0	0.00253	0.95213	0.47496	0.0	0.15	9.345E-02	-2.504E-02
7.0000E 00	5.0000E-01	3.5000E 00	0.95605	0.00942	0.00277	0.95610	0.47703	0.56	0.17	8.586E-02	-2.297E-02
7.0000E 00	1.0000E 00	3.5000E 00	0.96512	0.01497	0.00325	0.96524	0.48180	0.89	0.19	6.831E-02	-1.820E-02
7.0000E 00	1.5000E 00	3.5000E 00	0.97460	0.01632	0.00360	0.97474	0.48676	0.96	0.21	4.988E-02	-1.324E-02
7.0000E 00	2.0000E 00	3.5000E 00	0.98202	0.01530	0.00366	0.98215	0.49064	0.89	0.21	3.538E-02	-9.359E-03
7.0000E 00	2.5000E 00	3.5000E 00	0.98721	0.01351	0.00350	0.98731	0.49334	0.78	0.20	2.523E-02	-6.658E-03
7.0000E 00	3.0000E 00	3.5000E 00	0.99072	0.01168	0.00320	0.99079	0.49517	0.68	0.19	1.833E-02	-4.830E-03
7.0000E 00	0.0	4.0000E 00	0.95471	0.0	0.01145	0.95478	0.47634	0.0	0.69	8.840E-02	-2.366E-02
7.0000E 00	5.0000E-01	4.0000E 00	0.95851	0.00910	0.01089	0.95861	0.47834	0.54	0.65	8.106E-02	-2.166E-02
7.0000E 00	1.0000E 00	4.0000E 00	0.96726	0.01442	0.00955	0.96741	0.48293	0.85	0.57	6.411E-02	-1.707E-02
7.0000E 00	1.5000E 00	4.0000E 00	0.97635	0.01566	0.00800	0.97651	0.48769	0.92	0.47	4.643E-02	-1.231E-02
7.0000E 00	2.0000E 00	4.0000E 00	0.98340	0.01462	0.00661	0.98353	0.49137	0.85	0.39	3.266E-02	-8.634E-03
7.0000E 00	2.5000E 00	4.0000E 00	0.98827	0.01286	0.00547	0.98837	0.49390	0.75	0.32	2.313E-02	-6.102E-03
7.0000E 00	3.0000E 00	4.0000E 00	0.99152	0.01109	0.00455	0.99160	0.49559	0.64	0.26	1.674E-02	-4.409E-03
7.0000E 00	0.0	4.5000E 00	0.96368	0.0	0.01752	0.96384	0.48107	0.0	1.04	7.102E-02	-1.893E-02
7.0000E 00	5.0000E-01	4.5000E 00	0.96649	0.00753	0.01649	0.96666	0.48254	0.45	0.98	6.557E-02	-1.746E-02

Table B-4. Concluded.

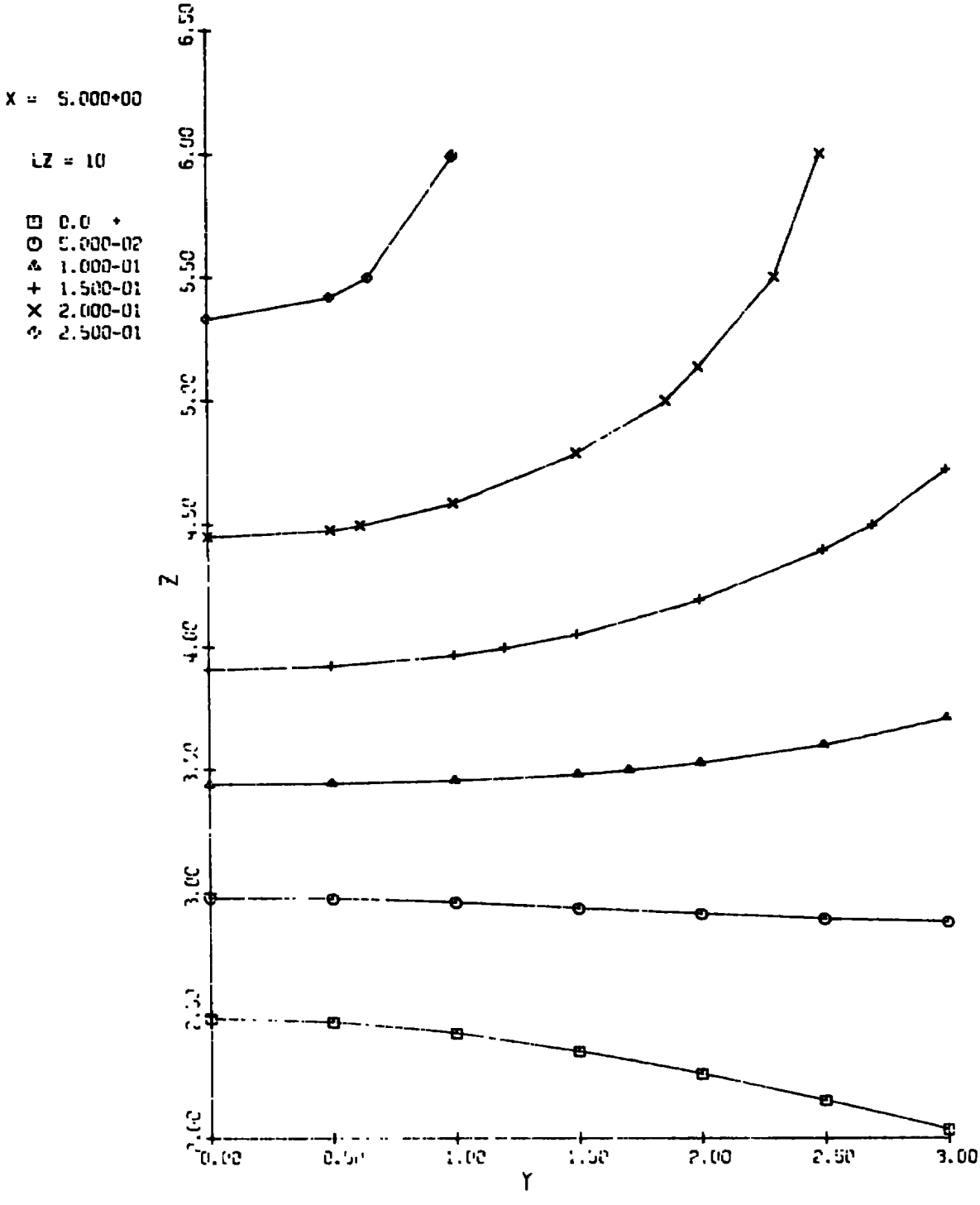
QUICK TURN WITH STRUT #1 M=.5
VELOCITIES PAGE 3

X	Y	Z	U	V	W	|V|	M	A(V,U)	A(W,U)	CP	M-MI
7.0000E 00	1.0000E 00	4.5000E 00	0.97308	0.01216	0.01402	0.97325	0.48599	0.72	0.83	5.278E-02	-1.401E-02
7.0000E 00	1.5000E 00	4.5000E 00	0.98014	0.01351	0.01123	0.98030	0.48967	0.79	0.66	3.902E-02	-1.033E-02
7.0000E 00	2.0000E 00	4.5000E 00	0.98581	0.01288	0.00884	0.98593	0.49262	0.75	0.51	2.794E-02	-7.379E-03
7.0000E 00	2.5000E 00	4.5000E 00	0.98983	0.01152	0.00698	0.98992	0.49471	0.67	0.40	2.006E-02	-5.289E-03
7.0000E 00	3.0000E 00	4.5000E 00	0.99257	0.01006	0.00559	0.99264	0.49614	0.58	0.32	1.467E-02	-3.863E-03
7.0000E 00	0.0	5.0000E 00	0.97435	0.0	0.01900	0.97454	0.48666	0.0	1.12	5.028E-02	-1.334E-02
7.0000E 00	5.0000E-01	5.0000E 00	0.97603	0.00553	0.01799	0.97621	0.48753	0.32	1.06	4.702E-02	-1.247E-02
7.0000E 00	1.0000E 00	5.0000E 00	0.98009	0.00922	0.01547	0.98026	0.48965	0.54	0.90	3.909E-02	-1.035E-02
7.0000E 00	1.5000E 00	5.0000E 00	0.98470	0.01068	0.01253	0.98484	0.49205	0.62	0.73	3.009E-02	-7.950E-03
7.0000E 00	2.0000E 00	5.0000E 00	0.98864	0.01059	0.00990	0.98875	0.49410	0.61	0.57	2.237E-02	-5.901E-03
7.0000E 00	2.5000E 00	5.0000E 00	0.99161	0.00978	0.00780	0.99168	0.49564	0.56	0.45	1.656E-02	-4.363E-03
7.0000E 00	3.0000E 00	5.0000E 00	0.99372	0.00876	0.00621	0.99378	0.49674	0.50	0.36	1.240E-02	-3.264E-03
7.0000E 00	0.0	5.5000E 00	0.98303	0.0	0.01738	0.98319	0.49118	0.0	1.01	3.334E-02	-8.816E-03
7.0000E 00	5.0000E-01	5.5000E 00	0.98391	0.00381	0.01661	0.98406	0.49164	0.22	0.97	3.162E-02	-8.357E-03
7.0000E 00	1.0000E 00	5.5000E 00	0.98614	0.00659	0.01465	0.98627	0.49280	0.38	0.85	2.728E-02	-7.202E-03
7.0000E 00	1.5000E 00	5.5000E 00	0.98883	0.00799	0.01222	0.98894	0.49420	0.46	0.71	2.201E-02	-5.804E-03
7.0000E 00	2.0000E 00	5.5000E 00	0.99131	0.00830	0.00990	0.99140	0.49549	0.48	0.57	1.713E-02	-4.514E-03
7.0000E 00	2.5000E 00	5.5000E 00	0.99332	0.00797	0.00795	0.99338	0.49653	0.46	0.46	1.319E-02	-3.472E-03
7.0000E 00	3.0000E 00	5.5000E 00	0.99484	0.00737	0.00640	0.99489	0.49732	0.42	0.37	1.020E-02	-2.682E-03
7.0000E 00	0.0	6.0000E 00	0.98890	0.0	0.01468	0.98901	0.49424	0.0	0.85	2.185E-02	-5.763E-03
7.0000E 00	5.0000E-01	6.0000E 00	0.98935	0.00259	0.01417	0.98945	0.49447	0.15	0.82	2.098E-02	-5.533E-03
7.0000E 00	1.0000E 00	6.0000E 00	0.99051	0.00462	0.01281	0.99060	0.49507	0.27	0.74	1.871E-02	-4.930E-03
7.0000E 00	1.5000E 00	6.0000E 00	0.99200	0.00584	0.01103	0.99208	0.49585	0.34	0.64	1.577E-02	-4.154E-03
7.0000E 00	2.0000E 00	6.0000E 00	0.99349	0.00634	0.00922	0.99355	0.49662	0.37	0.53	1.285E-02	-3.383E-03
7.0000E 00	2.5000E 00	6.0000E 00	0.99478	0.00635	0.00760	0.99483	0.49729	0.37	0.44	1.031E-02	-2.713E-03
7.0000E 00	3.0000E 00	6.0000E 00	0.99583	0.00608	0.00624	0.99586	0.49783	0.35	0.36	8.255E-03	-2.171E-03

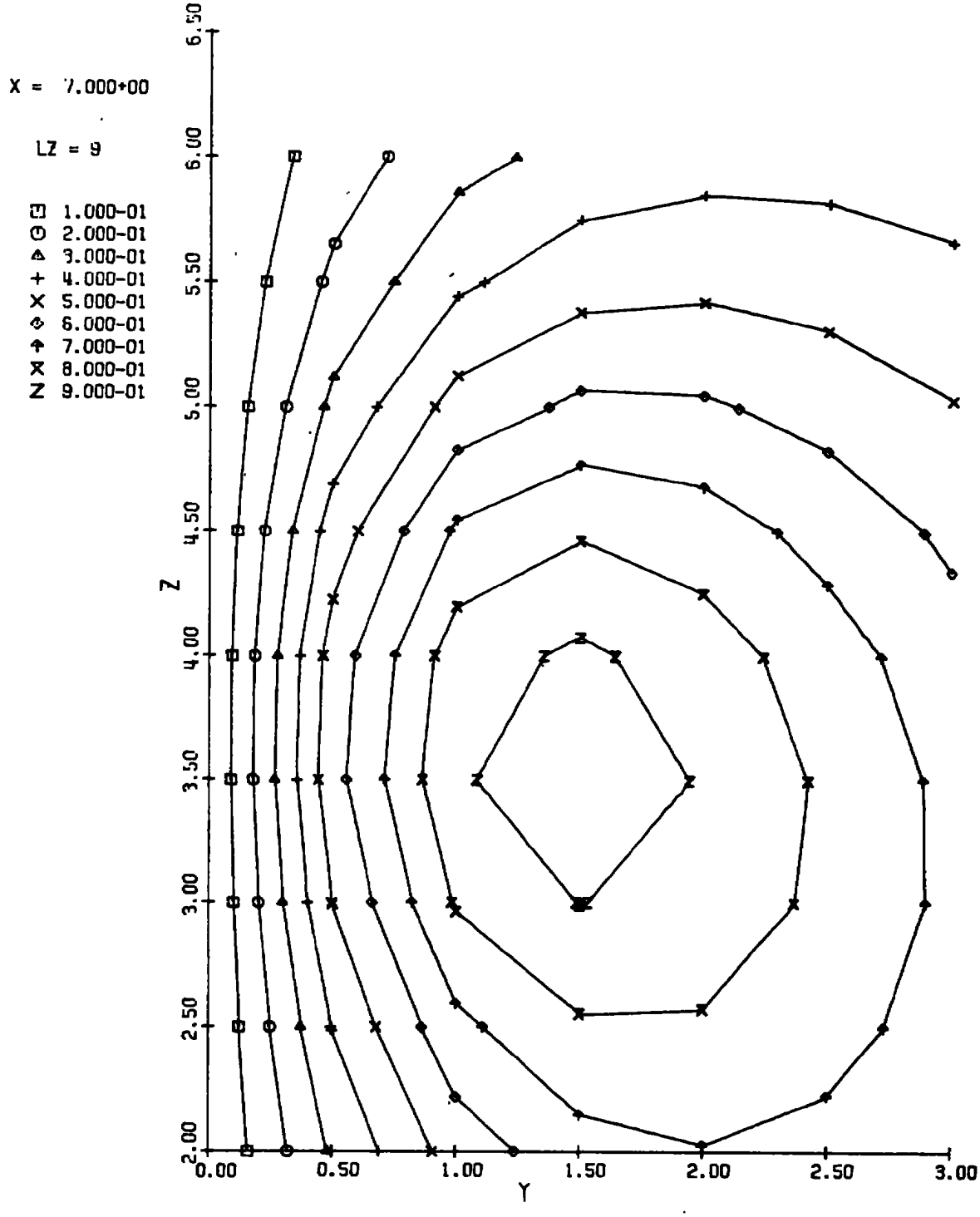


a. Lines of constant sidewash at X-station 5

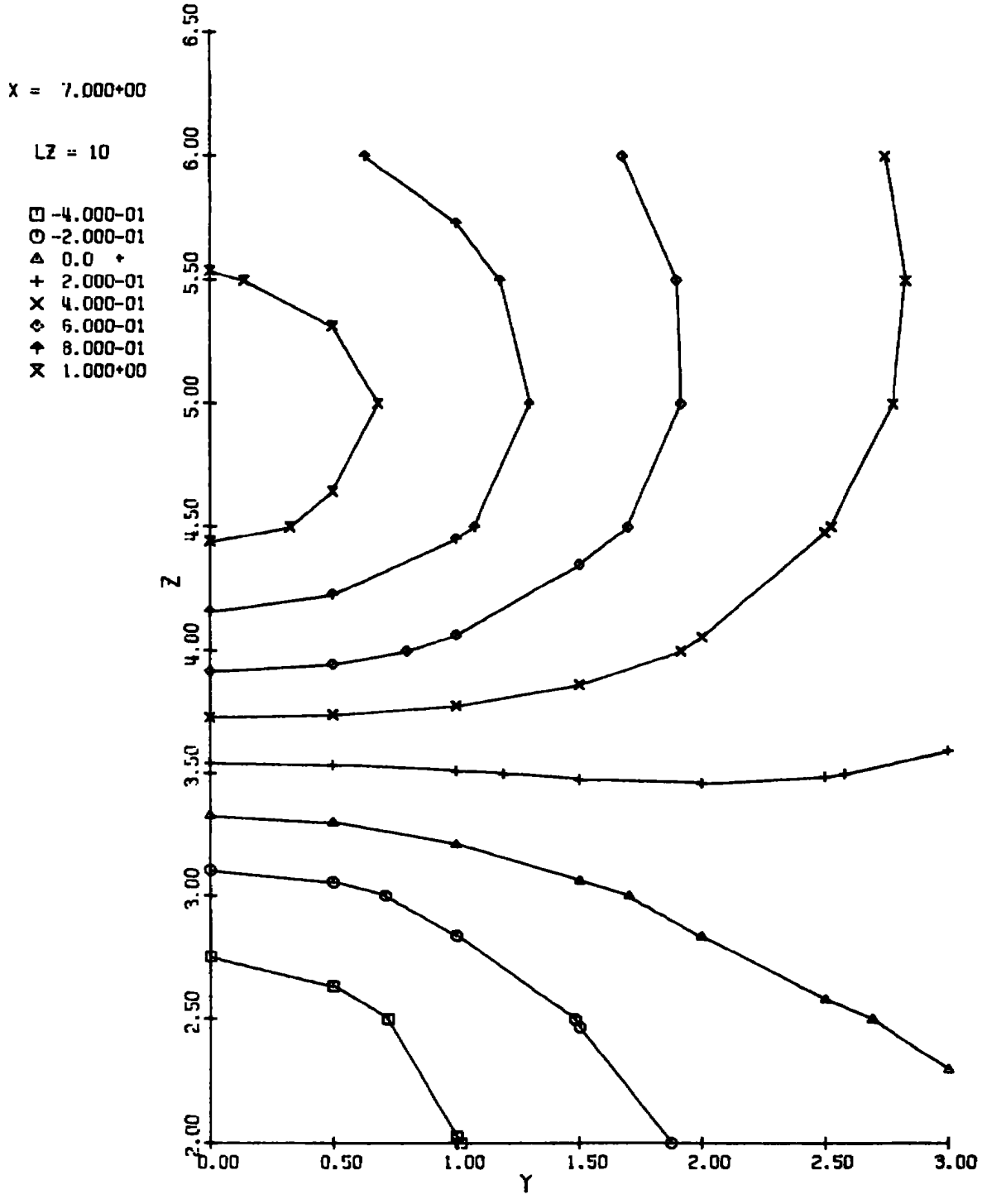
Figure B-2. Flow angularity data.



b. Lines of constant upwash at X-station 5
Figure B-2. Continued.



c. Lines of constant sidewash at X-station 7
Figure B-2. Continued.



d. Lines of constant upwash at X-station 7
Figure B-2. Concluded.

QUICK TURN WITH STRUT #1 M=.5

STREAMLINE 1 PAGE 1

AN = 1.000 AX = 3.000 DSO = 2.0000E-01

Table B-5. Streamline Data Tabulation

X	Y	Z	U	V	W	|V|	M	A(V,U)	A(W,U)	CP	M-MI
6.0000E 00	5.0000E-01	3.7500E 00	0.98021	0.00268	0.00373	0.98022	0.48963	0.16	0.22	3.917E-02	-1.037E-02
6.2000E 00	5.0061E-01	3.7508E 00	0.97742	0.00331	0.00417	0.97744	0.48817	0.19	0.24	4.461E-02	-1.183E-02
6.4000E 00	5.0138E-01	3.7517E 00	0.97397	0.00417	0.00469	0.97399	0.48637	0.25	0.28	5.135E-02	-1.363E-02
6.6000E 00	5.0236E-01	3.7527E 00	0.96959	0.00535	0.00531	0.96962	0.48409	0.32	0.31	5.983E-02	-1.591E-02
6.8000E 00	5.0364E-01	3.7539E 00	0.96396	0.00704	0.00607	0.96401	0.48115	0.42	0.36	7.065E-02	-1.885E-02
7.0000E 00	5.0537E-01	3.7553E 00	0.95655	0.00953	0.00700	0.95662	0.47730	0.57	0.42	8.488E-02	-2.270E-02
7.1999E 00	5.0777E-01	3.7569E 00	0.94655	0.01333	0.00818	0.94668	0.47212	0.81	0.50	1.038E-01	-2.788E-02
7.3999E 00	5.1126E-01	3.7588E 00	0.93273	0.01941	0.00972	0.93298	0.46499	1.19	0.60	1.296E-01	-3.501E-02
7.5998E 00	5.1657E-01	3.7611E 00	0.91315	0.02961	0.01181	0.91371	0.45498	1.86	0.74	1.651E-01	-4.502E-02
7.7996E 00	5.2519E-01	3.7641E 00	0.88504	0.04774	0.01482	0.88645	0.44087	3.09	0.96	2.142E-01	-5.913E-02
7.9989E 00	5.4020E-01	3.7680E 00	0.84543	0.08179	0.01936	0.84959	0.42187	5.53	1.31	2.782E-01	-7.813E-02
8.1106E 00	5.5336E-01	3.7709E 00	0.81844	0.11366	0.02291	0.82661	0.41007	7.91	1.60	3.167E-01	-8.993E-02
8.1938E 00	5.6680E-01	3.7734E 00	0.79821	0.14683	0.02618	0.81202	0.40260	10.42	1.88	3.406E-01	-9.740E-02
8.2558E 00	5.7954E-01	3.7756E 00	0.78549	0.17828	0.02901	0.80599	0.39951	12.79	2.11	3.504E-01	-1.005E-01
8.3171E 00	5.9502E-01	3.7780E 00	0.77813	0.21589	0.03214	0.80817	0.40062	15.51	2.37	3.469E-01	-9.938E-02
8.3775E 00	6.1348E-01	3.7806E 00	0.78061	0.25918	0.03550	0.82328	0.40836	18.37	2.60	3.222E-01	-9.164E-02
8.4370E 00	6.3480E-01	3.7834E 00	0.79855	0.30593	0.03889	0.85603	0.42518	20.96	2.79	2.672E-01	-7.482E-02
8.4957E 00	6.5837E-01	3.7863E 00	0.83772	0.35130	0.04202	0.90937	0.45273	22.75	2.87	1.730E-01	-4.727E-02
8.5538E 00	6.8309E-01	3.7892E 00	0.90202	0.38752	0.04453	0.98275	0.49096	23.25	2.83	3.420E-02	-9.044E-03
8.6417E 00	7.1876E-01	3.7933E 00	1.04258	0.40226	0.04654	1.11846	0.56277	21.10	2.56	-2.510E-01	6.277E-02
8.6919E 00	7.3674E-01	3.7955E 00	1.13457	0.37710	0.04657	1.19650	0.60481	18.39	2.35	-4.316E-01	1.048E-01
8.7301E 00	7.4848E-01	3.7970E 00	1.20119	0.33927	0.04609	1.24903	0.63345	15.77	2.20	-5.601E-01	1.334E-01
8.7592E 00	7.5607E-01	3.7981E 00	1.24567	0.30034	0.04550	1.28217	0.65166	13.56	2.09	-6.440E-01	1.517E-01
8.7885E 00	7.6249E-01	3.7991E 00	1.28248	0.25338	0.04475	1.30804	0.66596	11.18	2.00	-7.11CE-01	1.660E-01
8.8181E 00	7.6767E-01	3.8001E 00	1.30918	0.20005	0.04387	1.32510	0.67544	8.69	1.92	-7.559E-01	1.754E-01
8.8478E 00	7.7154E-01	3.8011E 00	1.32391	0.14266	0.04293	1.33226	0.67942	6.15	1.86	-7.749E-01	1.794E-01
8.8777E 00	7.7410E-01	3.8021E 00	1.32559	0.08396	0.04197	1.32891	0.67756	3.62	1.81	-7.660E-01	1.776E-01
8.9077E 00	7.7536E-01	3.8030E 00	1.31417	0.02692	0.04107	1.31508	0.66987	1.17	1.79	-7.294E-01	1.699E-01
8.9377E 00	7.7537E-01	3.8039E 00	1.29056	-0.02566	0.04028	1.29144	0.65678	-1.14	1.79	-6.678E-01	1.568E-01
8.9677E 00	7.7423E-01	3.8049E 00	1.25652	-0.07137	0.03967	1.25917	0.63901	-3.25	1.81	-5.855E-01	1.390E-01
8.9976E 00	7.7205E-01	3.8058E 00	1.21447	-0.10841	0.03929	1.21993	0.61755	-5.10	1.85	-4.882E-01	1.176E-01
9.0275E 00	7.6899E-01	3.8068E 00	1.16711	-0.13569	0.03920	1.17562	0.59351	-6.63	1.92	-3.821E-01	9.351E-02
9.0573E 00	7.6523E-01	3.8078E 00	1.11718	-0.15283	0.03945	1.12827	0.56802	-7.79	2.02	-2.730E-01	6.802E-02
9.0870E 00	7.6097E-01	3.8089E 00	1.06721	-0.16004	0.04007	1.07989	0.54220	-8.53	2.15	-1.662E-01	4.220E-02
9.1315E 00	7.5421E-01	3.8107E 00	0.99689	-0.15373	0.04177	1.00953	0.50501	-8.77	2.40	-1.916E-02	5.009E-03
9.1983E 00	7.4487E-01	3.8138E 00	0.91213	-0.11312	0.04607	0.92027	0.45839	-7.07	2.89	1.531E-01	-4.161E-02
9.2487E 00	7.3982E-01	3.8165E 00	0.87017	-0.06588	0.05052	0.87412	0.43451	-4.33	3.32	2.359E-01	-6.549E-02
9.2866E 00	7.3782E-01	3.8188E 00	0.85211	-0.02500	0.05435	0.85421	0.42425	-1.68	3.65	2.703E-01	-7.575E-02
9.3245E 00	7.3767E-01	3.8213E 00	0.84572	0.01792	0.05836	0.84792	0.42101	1.21	3.95	2.810E-01	-7.899E-02
9.3623E 00	7.3942E-01	3.8240E 00	0.85084	0.06066	0.06232	0.85527	0.42479	4.08	4.19	2.685E-01	-7.521E-02
9.4001E 00	7.4298E-01	3.8269E 00	0.86708	0.10107	0.06595	0.87544	0.43519	6.65	4.35	2.336E-01	-6.481E-02
9.4376E 00	7.4805E-01	3.8297E 00	0.89386	0.13705	0.06899	0.90693	0.45147	8.72	4.41	1.775E-01	-4.853E-02
9.4750E 00	7.5427E-01	3.8326E 00	0.93024	0.16649	0.07122	0.94770	0.47265	10.15	4.38	1.019E-01	-2.735E-02
9.5123E 00	7.6119E-01	3.8354E 00	0.97485	0.18730	0.07247	0.99532	0.49754	10.88	4.25	9.342E-03	-2.457E-03
9.5681E 00	7.7182E-01	3.8394E 00	1.05249	0.19826	0.07226	1.07343	0.53877	10.67	3.93	-1.523E-01	3.877E-02
9.6524E 00	7.8546E-01	3.8447E 00	1.17153	0.16066	0.06718	1.18439	0.59825	7.81	3.28	-4.028E-01	9.825E-02
9.7001E 00	7.9088E-01	3.8473E 00	1.22406	0.11109	0.06209	1.23066	0.62340	5.19	2.90	-5.145E-01	1.234E-01
9.7360E 00	7.9343E-01	3.8490E 00	1.24996	0.06380	0.05751	1.25290	0.63557	2.92	2.63	-5.698E-01	1.356E-01
9.7721E 00	7.9451E-01	3.8506E 00	1.26133	0.01150	0.05252	1.26248	0.64082	0.52	2.38	-5.938E-01	1.408E-01
9.8081E 00	7.9408E-01	3.8520E 00	1.25703	-0.04175	0.04734	1.25861	0.63870	-1.90	2.16	-5.841E-01	1.387E-01

Table B-5. Continued

QUICK TURN WITH STRUT #1 M=.5
STREAMLINE 1 PAGE 2
AN = 1.000 AX = 3.000 DSO = 2.0000E-01

X	Y	Z	U	V	W	|V|	M	A(V,U)	A(W,U)	CP	M-MI
9.8441E 00	7.9215E-01	3.8533E 00	1.23754	-0.09175	0.04225	1.24165	0.62941	-4.24	1.96	-5.417E-01	1.294E-01
9.8800E 00	7.8882E-01	3.8545E 00	1.20485	-0.13479	0.03750	1.21295	0.61375	-6.38	1.78	-4.712E-01	1.137E-01
9.9158E 00	7.8425E-01	3.8556E 00	1.16216	-0.16805	0.03334	1.17472	0.59302	-8.23	1.64	-3.800E-01	9.302E-02
9.9514E 00	7.7864E-01	3.8566E 00	1.11323	-0.18986	0.02997	1.12970	0.56879	-9.68	1.54	-2.762E-01	6.879E-02
9.9869E 00	7.7228E-01	3.8575E 00	1.06190	-0.19971	0.02758	1.08086	0.54272	-10.65	1.49	-1.683E-01	4.272E-02
1.0040E 01	7.6210E-01	3.8589E 00	0.98779	-0.19313	0.02612	1.00683	0.50359	-11.06	1.51	-1.370E-02	3.587E-03
1.0120E 01	7.4783E-01	3.8612E 00	0.89949	-0.14434	0.02888	0.91145	0.45381	-9.12	1.84	1.693E-01	-4.619E-02
1.0165E 01	7.4150E-01	3.8628E 00	0.86692	-0.10290	0.03273	0.87362	0.43425	-6.77	2.16	2.368E-01	-6.575E-02
1.0199E 01	7.3812E-01	3.8642E 00	0.85151	-0.06783	0.03640	0.85498	0.42465	-4.55	2.45	2.690E-01	-7.535E-02
1.0233E 01	7.3613E-01	3.8657E 00	0.84396	-0.03082	0.04046	0.84549	0.41976	-2.09	2.74	2.852E-01	-8.024E-02
1.0267E 01	7.3565E-01	3.8675E 00	0.84419	0.00689	0.04461	0.84539	0.41971	0.47	3.02	2.853E-01	-8.029E-02
1.0302E 01	7.3668E-01	3.8693E 00	0.85206	0.04415	0.04853	0.85458	0.42444	2.97	3.26	2.697E-01	-7.556E-02
1.0336E 01	7.3913E-01	3.8713E 00	0.86740	0.07981	0.05191	0.87261	0.43372	5.26	3.42	2.386E-01	-6.628E-02
1.0370E 01	7.4286E-01	3.8734E 00	0.88999	0.11279	0.05447	0.89876	0.44723	7.22	3.50	1.922E-01	-5.277E-02
1.0404E 01	7.4762E-01	3.8755E 00	0.91953	0.14189	0.05596	0.93209	0.46453	8.77	3.48	1.312E-01	-3.547E-02
1.0437E 01	7.5316E-01	3.8775E 00	0.95559	0.16587	0.05618	0.97150	0.48507	9.85	3.36	5.619E-02	-1.493E-02
1.0471E 01	7.5917E-01	3.8794E 00	0.99743	0.18341	0.05500	1.01564	0.50822	10.42	3.16	-3.152E-02	8.220E-03
1.0521E 01	7.6841E-01	3.8820E 00	1.06850	0.19480	0.05043	1.08728	0.54613	10.33	2.70	-1.822E-01	4.613E-02
1.0597E 01	7.8079E-01	3.8850E 00	1.18123	0.17105	0.03734	1.19414	0.60353	8.24	1.81	-4.260E-01	1.035E-01
1.0655E 01	7.8762E-01	3.8864E 00	1.25416	0.11847	0.02318	1.25996	0.63944	5.40	1.06	-5.875E-01	1.394E-01
1.0698E 01	7.9070E-01	3.8870E 00	1.29218	0.06244	0.01077	1.29373	0.65804	2.77	0.48	-6.737E-01	1.580E-01
1.0741E 01	7.9170E-01	3.8871E 00	1.31009	-0.00247	-0.00256	1.31009	0.66710	-0.11	-0.11	-7.163E-01	1.671E-01
1.0785E 01	7.9051E-01	3.8868E 00	1.30536	-0.06961	-0.01620	1.30732	0.66556	-3.05	-0.71	-7.091E-01	1.656E-01
1.0828E 01	7.8714E-01	3.8860E 00	1.27875	-0.13194	-0.02953	1.28588	0.65371	-5.89	-1.32	-6.535E-01	1.537E-01
1.0871E 01	7.8175E-01	3.8848E 00	1.23408	-0.18348	-0.04193	1.24835	0.63308	-8.46	-1.95	-5.584E-01	1.331E-01
1.0914E 01	7.7459E-01	3.8831E 00	1.17714	-0.22034	-0.05293	1.19875	0.60603	-10.60	-2.57	-4.370E-01	1.060E-01
1.0956E 01	7.6605E-01	3.8810E 00	1.11425	-0.24104	-0.06213	1.14171	0.57524	-12.21	-3.19	-3.035E-01	7.524E-02
1.0998E 01	7.5655E-01	3.8784E 00	1.05108	-0.24615	-0.06931	1.08174	0.54319	-13.18	-3.77	-1.702E-01	4.319E-02
1.1040E 01	7.4659E-01	3.8755E 00	0.99196	-0.23757	-0.07435	1.02271	0.51195	-13.47	-4.29	-4.595E-02	1.195E-02
1.1103E 01	7.3196E-01	3.8704E 00	0.91663	-0.20463	-0.07799	0.94242	0.46990	-12.58	-4.86	1.118E-01	-3.010E-02
1.1167E 01	7.1912E-01	3.8648E 00	0.86054	-0.15532	-0.07745	0.87787	0.43644	-10.23	-5.14	2.293E-01	-6.356E-02
1.1215E 01	7.1155E-01	3.8605E 00	0.83123	-0.11181	-0.07484	0.84205	0.41800	-7.66	-5.14	2.910E-01	-8.200E-02
1.1251E 01	7.0741E-01	3.8573E 00	0.81612	-0.07694	-0.07194	0.82289	0.40816	-5.39	-5.04	3.228E-01	-9.184E-02
1.1287E 01	7.0478E-01	3.8541E 00	0.80672	-0.04091	-0.06846	0.81066	0.40190	-2.90	-4.85	3.428E-01	-9.810E-02
1.1324E 01	7.0376E-01	3.8511E 00	0.80302	-0.00424	-0.06459	0.80563	0.39932	-0.30	-4.60	3.510E-01	-1.007E-01
1.1360E 01	7.0440E-01	3.8483E 00	0.80519	0.03255	-0.06053	0.80811	0.40060	2.31	-4.30	3.470E-01	-9.940E-02
1.1397E 01	7.0669E-01	3.8456E 00	0.81359	0.06885	-0.05649	0.81845	0.40589	4.84	-3.97	3.301E-01	-9.411E-02
1.1433E 01	7.1051E-01	3.8432E 00	0.82876	0.10393	-0.05264	0.83691	0.41536	7.15	-3.63	2.996E-01	-8.464E-02
1.1469E 01	7.1569E-01	3.8410E 00	0.85127	0.13677	-0.04916	0.86359	0.42907	9.13	-3.30	2.542E-01	-7.093E-02
1.1505E 01	7.2198E-01	3.8391E 00	0.88159	0.16606	-0.04619	0.89828	0.44699	10.67	-3.00	1.931E-01	-5.301E-02
1.1541E 01	7.2907E-01	3.8373E 00	0.91989	0.19016	-0.04384	0.94036	0.46882	11.68	-2.73	1.157E-01	-3.118E-02

***** N>NX *****

Table B-5. Continued

QUICK TURN WITH STRUT #1 M=.5
STREAMLINE 2 PAGE 1
AN = 1.000 AX = 3.000 DSO = 2.0000E-01

X	Y	Z	U	V	W	|V|	M	A(V,U)	A(W,U)	CP	M-MI
6.0000E 00	1.0000E 00	3.7500E 00	0.96208	0.00485	0.00359	0.98209	0.49061	0.28	0.21	3.549E-02	-9.388E-03
6.2000E 00	1.0011E 00	3.7503E 00	0.97989	0.00590	0.00400	0.97991	0.48947	0.34	0.23	3.977E-02	-1.053E-02
6.4000E 00	1.0024E 00	3.7516E 00	0.97728	0.00727	0.00448	0.97731	0.48811	0.43	0.26	4.486E-02	-1.189E-02
6.6000E 00	1.0041E 00	3.7526E 00	0.97415	0.00909	0.00504	0.97420	0.48648	0.53	0.30	5.093E-02	-1.352E-02
6.8000E 00	1.0062E 00	3.7537E 00	0.97038	0.01157	0.00572	0.97046	0.48453	0.68	0.34	5.820E-02	-1.547E-02
6.9999E 00	1.0090E 00	3.7550E 00	0.96584	0.01500	0.00653	0.96598	0.48218	0.89	0.39	6.685E-02	-1.782E-02
7.1999E 00	1.0126E 00	3.7564E 00	0.96042	0.01982	0.00751	0.96066	0.47941	1.18	0.45	7.713E-02	-2.059E-02
7.3998E 00	1.0175E 00	3.7581E 00	0.95413	0.02673	0.00874	0.95454	0.47621	1.60	0.52	8.885E-02	-2.379E-02
7.5997E 00	1.0241E 00	3.7601E 00	0.94727	0.03673	0.01027	0.94803	0.47282	2.22	0.62	1.012E-01	-2.718E-02
7.7995E 00	1.0334E 00	3.7625E 00	0.94099	0.05113	0.01222	0.94246	0.46992	3.11	0.74	1.118E-01	-3.008E-02
7.9990E 00	1.0464E 00	3.7654E 00	0.93829	0.07116	0.01471	0.94110	0.46921	4.34	0.90	1.143E-01	-3.079E-02
8.1982E 00	1.0641E 00	3.7688E 00	0.94545	0.09601	0.01781	0.95048	0.47409	5.80	1.08	9.659E-02	-2.591E-02
8.3969E 00	1.0864E 00	3.7729E 00	0.97115	0.11822	0.02145	0.97855	0.48876	6.94	1.27	4.244E-02	-1.124E-02
8.5954E 00	1.1102E 00	3.7775E 00	1.01574	0.11588	0.02524	1.02310	0.51215	6.73	1.42	-4.673E-02	1.215E-02
8.7943E 00	1.1302E 00	3.7827E 00	1.05326	0.08786	0.02878	1.05731	0.53022	4.77	1.57	-1.179E-01	3.022E-02
8.9938E 00	1.1429E 00	3.7885E 00	1.05177	0.04593	0.03232	1.05326	0.52808	2.50	1.76	-1.094E-01	2.808E-02
9.1935E 00	1.1504E 00	3.7951E 00	1.02797	0.03240	0.03644	1.02912	0.51532	1.81	2.03	-5.909E-02	1.532E-02
9.3933E 00	1.1577E 00	3.8026E 00	1.02438	0.04281	0.04040	1.02607	0.51371	2.39	2.26	-5.282E-02	1.371E-02
9.5929E 00	1.1659E 00	3.8105E 00	1.04705	0.04254	0.04198	1.04876	0.52569	2.33	2.30	-9.989E-02	2.569E-02
9.7927E 00	1.1718E 00	3.8183E 00	1.06246	0.01869	0.03995	1.06337	0.53343	1.01	2.15	-1.308E-01	3.343E-02
9.9925E 00	1.1734E 00	3.8254E 00	1.05041	-0.00144	0.03577	1.05102	0.52689	-0.08	1.95	-1.046E-01	2.689E-02
1.0192E 01	1.1736E 00	3.8318E 00	1.03639	0.00403	0.03104	1.03686	0.51940	0.22	1.72	-7.507E-02	1.940E-02
1.0392E 01	1.1757E 00	3.8371E 00	1.04838	0.01783	0.02436	1.04882	0.52572	0.97	1.33	-1.000E-01	2.572E-02
1.0592E 01	1.1783E 00	3.8407E 00	1.07747	0.00974	0.01320	1.07759	0.54098	0.52	0.70	-1.612E-01	4.098E-02
1.0792E 01	1.1771E 00	3.8418E 00	1.08728	-0.02387	-0.00181	1.08754	0.54627	-1.26	-0.10	-1.827E-01	4.627E-02
1.0992E 01	1.1701E 00	3.8401E 00	1.06108	-0.05132	-0.01608	1.06244	0.53294	-2.77	-0.87	-1.288E-01	3.294E-02
1.1192E 01	1.1606E 00	3.8361E 00	1.02540	-0.04813	-0.02540	1.02684	0.51412	-2.69	-1.42	-5.440E-02	1.412E-02
1.1392E 01	1.1534E 00	3.8307E 00	1.01274	-0.02500	-0.02938	1.01348	0.50708	-1.41	-1.66	-2.714E-02	7.083E-03
1.1591E 01	1.1498E 00	3.8249E 00	1.02980	-0.01169	-0.03047	1.03032	0.51595	-0.65	-1.69	-6.155E-02	1.595E-02
1.1791E 01	1.1458E 00	3.8190E 00	1.05023	-0.03000	-0.03096	1.05111	0.52694	-1.64	-1.69	-1.048E-01	2.694E-02
1.1991E 01	1.1369E 00	3.8131E 00	1.03704	-0.06376	-0.03083	1.03946	0.52078	-3.52	-1.70	-8.047E-02	2.078E-02
1.2191E 01	1.1234E 00	3.8072E 00	0.99495	-0.07361	-0.02885	0.99808	0.49899	-4.23	-1.66	3.829E-03	-1.006E-03
1.2390E 01	1.1108E 00	3.8017E 00	0.96068	-0.04969	-0.02502	0.96229	0.48026	-2.96	-1.49	7.400E-02	-1.974E-02
1.2590E 01	1.1046E 00	3.7970E 00	0.95597	-0.01023	-0.02051	0.95625	0.47710	-0.61	-1.23	8.555E-02	-2.290E-02
1.2790E 01	1.1058E 00	3.7931E 00	0.98486	0.02178	-0.01654	0.98524	0.49226	1.27	-0.96	2.930E-02	-7.740E-03
1.2990E 01	1.1101E 00	3.7901E 00	1.03682	0.02102	-0.01399	1.03712	0.51955	1.16	-0.77	-7.563E-02	1.955E-02
1.3190E 01	1.1098E 00	3.7875E 00	1.07322	-0.02458	-0.01299	1.07358	0.53885	-1.31	-0.69	-1.526E-01	3.885E-02
1.3339E 01	1.1032E 00	3.7857E 00	1.06565	-0.06930	-0.01266	1.06798	0.53588	-3.72	-0.68	-1.406E-01	3.588E-02
1.3489E 01	1.0913E 00	3.7840E 00	1.03315	-0.09854	-0.01207	1.03791	0.51996	-5.45	-0.67	-7.726E-02	1.996E-02
1.3638E 01	1.0764E 00	3.7823E 00	0.99595	-0.10444	-0.01104	1.00147	0.50077	-5.99	-0.63	-2.941E-03	7.716E-04
1.3837E 01	1.0568E 00	3.7802E 00	0.96236	-0.08848	-0.00927	0.96646	0.48244	-5.25	-0.55	6.595E-02	-1.756E-02
1.4037E 01	1.0407E 00	3.7785E 00	0.94960	-0.06535	-0.00760	0.95187	0.47482	-3.94	-0.46	9.394E-02	-2.518E-02
1.4236E 01	1.0290E 00	3.7770E 00	0.94886	-0.04559	-0.00632	0.94998	0.47383	-2.75	-0.38	9.754E-02	-2.617E-02
1.4436E 01	1.0210E 00	3.7758E 00	0.95285	-0.03111	-0.00545	0.95341	0.47563	-1.87	-0.33	9.100E-02	-2.437E-02
1.4636E 01	1.0155E 00	3.7747E 00	0.95803	-0.02097	-0.00493	0.95827	0.47816	-1.25	-0.29	8.172E-02	-2.184E-02
1.4836E 01	1.0119E 00	3.7737E 00	0.96280	-0.01387	-0.00469	0.96292	0.48058	-0.83	-0.28	7.279E-02	-1.942E-02
1.5036E 01	1.0096E 00	3.7727E 00	0.96675	-0.00877	-0.00466	0.96680	0.48261	-0.52	-0.28	6.530E-02	-1.739E-02
1.5236E 01	1.0081E 00	3.7717E 00	0.96978	-0.00495	-0.00480	0.96981	0.48418	-0.29	-0.28	5.948E-02	-1.582E-02
1.5436E 01	1.0074E 00	3.7707E 00	0.97197	-0.00191	-0.00505	0.97199	0.48532	-0.11	-0.30	5.524E-02	-1.468E-02
1.5636E 01	1.0073E 00	3.7696E 00	0.97342	0.00067	-0.00538	0.97343	0.48608	0.04	-0.32	5.243E-02	-1.392E-02

Table B-5. Continued

```
QUICK TURN WITH STRUT #1      M=.5
STREAMLINE    2     PAGE    2
ΔN = 1.000      ΔX = 3.000      DSO =   2.0000E-01
  X             Y             Z             U          V          W          |V|        M          A(V,U)     A(W,U)     CP             M-MI
 1.5836E 01   1.0077E 00   3.7685E 00    0.97423    0.00307   -0.00578    0.97425    0.48651      0.18      -0.34     5.084E-02 -1.349E-02
 1.6036E 01   1.0086E 00   3.7673E 00    0.97448    0.00548   -0.00623    0.97452    0.48665      0.32      -0.37     5.032E-02 -1.335E-02

 ***** X>XX *****
```

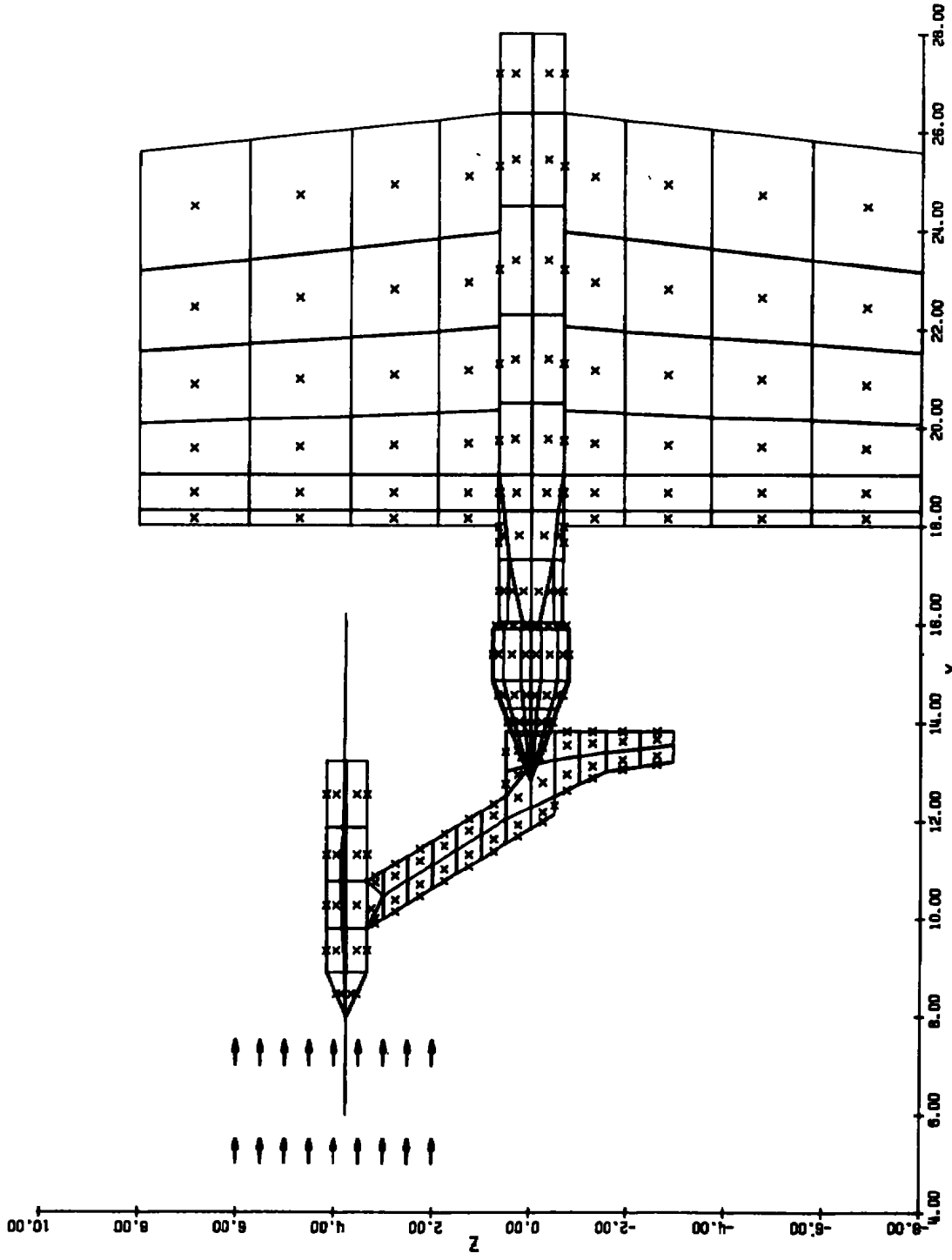
QUICK TURN WITH STRUT #1 M=.5
STREAMLINE 3 PAGE 1
AN = 1.000 AX = 3.000 DSO = 2.0000E-01

Table B-5. Continued

X	Y	Z	U	V	W	|V|	M	A(V,U)	A(W,U)	CP	M-MI
6.0000E 00	1.5000E 00	3.7500E 00	0.98457	0.00625	0.00339	0.98460	0.49192	0.36	0.20	3.056E-02	-8.076E-03
6.2000E 00	1.5014E 00	3.7507E 00	0.98307	0.00743	0.00376	0.98311	0.49114	0.43	0.22	3.350E-02	-8.858E-03
6.4000E 00	1.5031E 00	3.7515E 00	0.98139	0.00891	0.00417	0.98144	0.49027	0.52	0.24	3.678E-02	-9.732E-03
6.6000E 00	1.5051E 00	3.7524E 00	0.97952	0.01078	0.00466	0.97959	0.48930	0.63	0.27	4.040E-02	-1.070E-02
6.8000E 00	1.5075E 00	3.7534E 00	0.97750	0.01315	0.00522	0.97760	0.48826	0.77	0.31	4.430E-02	-1.174E-02
6.9999E 00	1.5105E 00	3.7546E 00	0.97537	0.01619	0.00589	0.97552	0.48717	0.95	0.35	4.836E-02	-1.283E-02
7.1999E 00	1.5142E 00	3.7559E 00	0.97328	0.02006	0.00667	0.97351	0.48612	1.18	0.39	5.228E-02	-1.388E-02
7.3998E 00	1.5189E 00	3.7573E 00	0.97151	0.02496	0.00759	0.97186	0.48526	1.47	0.45	5.549E-02	-1.474E-02
7.5997E 00	1.5246E 00	3.7590E 00	0.97053	0.03101	0.00868	0.97107	0.48484	1.83	0.51	5.703E-02	-1.516E-02
7.7996E 00	1.5317E 00	3.7609E 00	0.97111	0.03814	0.00998	0.97191	0.48528	2.25	0.59	5.539E-02	-1.472E-02
7.9994E 00	1.5404E 00	3.7631E 00	0.97426	0.04583	0.01150	0.97540	0.48711	2.69	0.68	4.859E-02	-1.289E-02
8.1991E 00	1.5504E 00	3.7657E 00	0.98089	0.05276	0.01326	0.98240	0.49077	3.08	0.77	3.485E-02	-9.228E-03
8.3988E 00	1.5615E 00	3.7685E 00	0.99101	0.05685	0.01523	0.99275	0.49620	3.28	0.88	1.444E-02	-3.802E-03
8.5984E 00	1.5729E 00	3.7718E 00	1.00265	0.05613	0.01736	1.00437	0.50229	3.20	0.99	-8.759E-03	2.295E-03
8.7981E 00	1.5834E 00	3.7755E 00	1.01232	0.05075	0.01956	1.01378	0.50724	2.87	1.11	-2.775E-02	7.241E-03
8.9979E 00	1.5927E 00	3.7795E 00	1.01785	0.04366	0.02172	1.01901	0.51000	2.46	1.22	-3.838E-02	9.995E-03
9.1977E 00	1.6007E 00	3.7840E 00	1.02079	0.03803	0.02369	1.02178	0.51145	2.13	1.33	-4.402E-02	1.145E-02
9.3975E 00	1.6078E 00	3.7887E 00	1.02437	0.03396	0.02516	1.02524	0.51328	1.90	1.41	-5.112E-02	1.328E-02
9.5973E 00	1.6139E 00	3.7937E 00	1.02938	0.02930	0.02577	1.03012	0.51585	1.63	1.43	-6.115E-02	1.585E-02
9.7972E 00	1.6190E 00	3.7986E 00	1.03390	0.02320	0.02523	1.03447	0.51814	1.29	1.40	-7.013E-02	1.814E-02
9.9971E 00	1.6229E 00	3.8033E 00	1.03679	0.01712	0.02346	1.03719	0.51958	0.95	1.30	-7.577E-02	1.958E-02
1.0197E 01	1.6257E 00	3.8076E 00	1.03944	0.01214	0.02046	1.03972	0.52091	0.67	1.13	-8.101E-02	2.091E-02
1.0397E 01	1.6275E 00	3.8111E 00	1.04327	0.00684	0.01628	1.04342	0.52287	0.38	0.89	-8.872E-02	2.287E-02
1.0597E 01	1.6281E 00	3.8137E 00	1.04678	-0.00082	0.01106	1.04684	0.52468	-0.05	0.61	-9.588E-02	2.468E-02
1.0797E 01	1.6271E 00	3.8153E 00	1.04674	-0.01040	0.00523	1.04681	0.52466	-0.57	0.29	-9.581E-02	2.466E-02
1.0997E 01	1.6243E 00	3.8157E 00	1.04195	-0.01876	-0.00048	1.04211	0.52218	-1.03	-0.03	-8.600E-02	2.218E-02
1.1197E 01	1.6202E 00	3.8151E 00	1.03488	-0.02338	-0.00538	1.03515	0.51851	-1.29	-0.30	-7.154E-02	1.851E-02
1.1397E 01	1.6155E 00	3.8137E 00	1.02910	-0.02491	-0.00909	1.02944	0.51549	-1.39	-0.51	-5.975E-02	1.549E-02
1.1597E 01	1.6105E 00	3.8117E 00	1.02561	-0.02627	-0.01159	1.02601	0.51368	-1.47	-0.65	-5.270E-02	1.368E-02
1.1797E 01	1.6051E 00	3.8093E 00	1.02209	-0.02924	-0.01305	1.02259	0.51188	-1.64	-0.73	-4.568E-02	1.188E-02
1.1997E 01	1.5991E 00	3.8067E 00	1.01585	-0.03232	-0.01361	1.01646	0.50865	-1.82	-0.77	-3.318E-02	8.650E-03
1.2196E 01	1.5927E 00	3.8040E 00	1.00751	-0.03229	-0.01341	1.00812	0.50426	-1.84	-0.76	-1.630E-02	4.264E-03
1.2396E 01	1.5867E 00	3.8014E 00	1.00081	-0.02794	-0.01262	1.00128	0.50067	-1.60	-0.72	-2.551E-03	6.694E-04
1.2596E 01	1.5818E 00	3.7990E 00	0.99926	-0.02150	-0.01150	0.99956	0.49977	-1.23	-0.66	8.885E-04	-2.332E-04
1.2796E 01	1.5779E 00	3.7969E 00	1.00337	-0.01722	-0.01030	1.00357	0.50188	-0.98	-0.59	-7.155E-03	1.876E-03
1.2996E 01	1.5743E 00	3.7949E 00	1.00990	-0.01861	-0.00922	1.01011	0.50531	-1.06	-0.52	-2.032E-02	5.311E-03
1.3196E 01	1.5700E 00	3.7932E 00	1.01340	-0.02573	-0.00833	1.01376	0.50723	-1.45	-0.47	-2.770E-02	7.230E-03
1.3396E 01	1.5640E 00	3.7916E 00	1.01021	-0.03454	-0.00756	1.01082	0.50569	-1.96	-0.43	-2.176E-02	5.687E-03
1.3596E 01	1.5566E 00	3.7902E 00	1.00143	-0.04005	-0.00682	1.00225	0.50118	-2.29	-0.39	-4.506E-03	1.182E-03
1.3796E 01	1.5486E 00	3.7889E 00	0.99126	-0.04015	-0.00609	0.99209	0.49585	-2.32	-0.35	1.576E-02	-4.150E-03
1.3996E 01	1.5409E 00	3.7877E 00	0.98314	-0.03600	-0.00543	0.98381	0.49151	-2.10	-0.32	3.211E-02	-8.488E-03
1.4195E 01	1.5341E 00	3.7867E 00	0.97819	-0.02983	-0.00488	0.97865	0.48881	-1.75	-0.29	4.224E-02	-1.119E-02
1.4395E 01	1.5287E 00	3.7857E 00	0.97595	-0.02337	-0.00449	0.97624	0.48755	-1.37	-0.26	4.695E-02	-1.245E-02
1.4595E 01	1.5245E 00	3.7848E 00	0.97551	-0.01751	-0.00426	0.97567	0.48725	-1.03	-0.25	4.806E-02	-1.275E-02
1.4795E 01	1.5214E 00	3.7840E 00	0.97604	-0.01250	-0.00419	0.97613	0.48749	-0.73	-0.25	4.716E-02	-1.251E-02
1.4995E 01	1.5193E 00	3.7831E 00	0.97700	-0.00830	-0.00425	0.97705	0.48797	-0.49	-0.25	4.538E-02	-1.203E-02
1.5195E 01	1.5180E 00	3.7822E 00	0.97806	-0.00478	-0.00442	0.97808	0.48851	-0.28	-0.26	4.336E-02	-1.149E-02
1.5395E 01	1.5173E 00	3.7813E 00	0.97903	-0.00173	-0.00468	0.97904	0.48901	-0.10	-0.27	4.148E-02	-1.099E-02
1.5595E 01	1.5172E 00	3.7803E 00	0.97985	0.00100	-0.00501	0.97986	0.48944	0.06	-0.29	3.987E-02	-1.056E-02
1.5795E 01	1.5177E 00	3.7792E 00	0.98050	0.00358	-0.00539	0.98052	0.48979	0.21	-0.31	3.856E-02	-1.021E-02

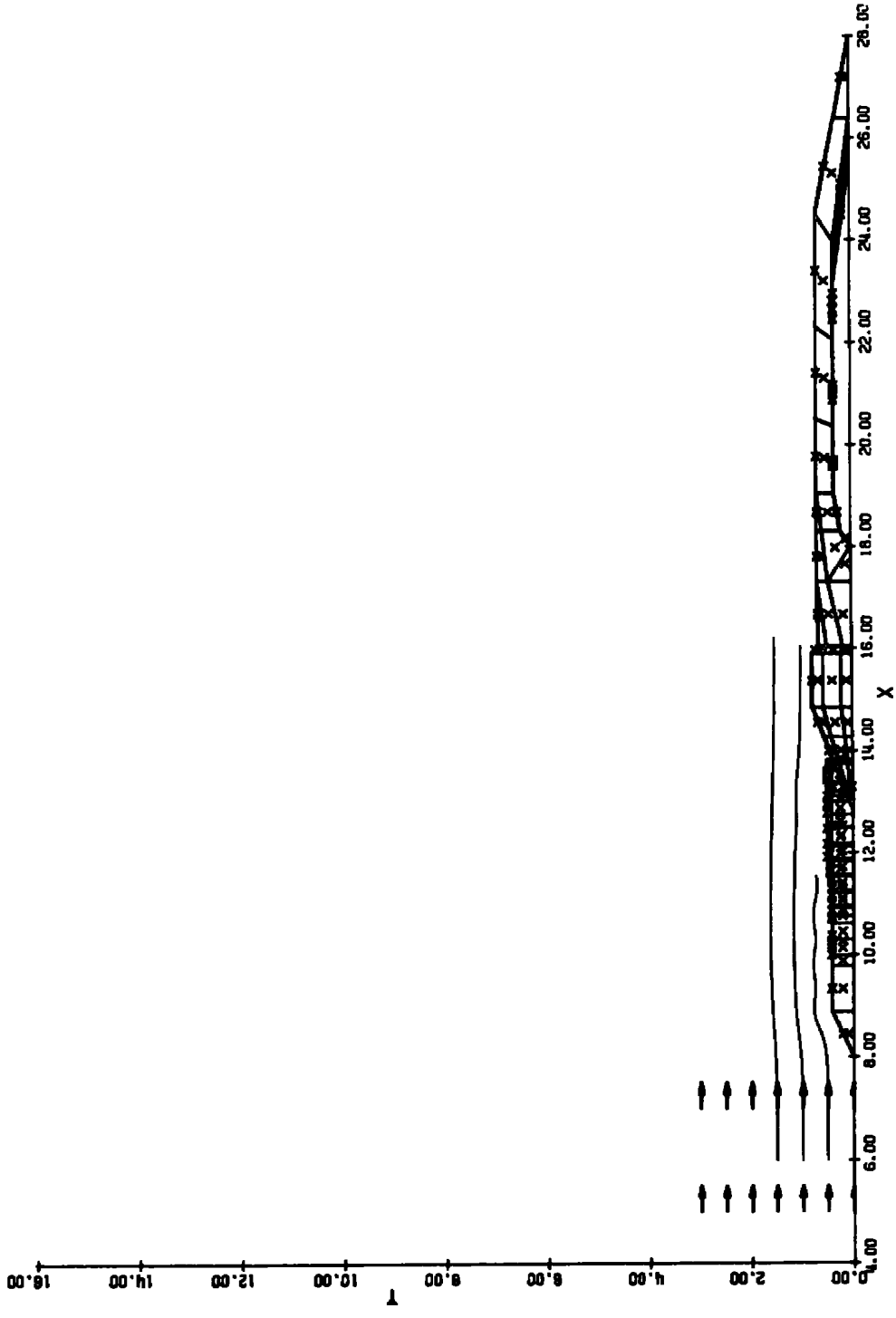
Table B-5. Concluded

```
QUICK TURN WITH STRUT #1      M=.5
STREAMLINE    3     PAGE    2
AN = 1.000      AX = 3.000      DSO =  2.0000E-01
  X             Y             Z             U          V          W          |V|        M        A(V,U)    A(W,U)    CP           M-MI
 1.5995E 01  1.5187E 00  3.7781E 00   0.98102   0.00615  -0.00581   0.98105   0.49007    0.36     -0.34   3.753E-02 -9.932E-03
 1.6195E 01  1.5202E 00  3.7768E 00   0.98146   0.00883  -0.00627   0.98152   0.49031    0.52     -0.37   3.661E-02 -9.687E-03

 ***** X>XX *****

JOB COMPLETED
```

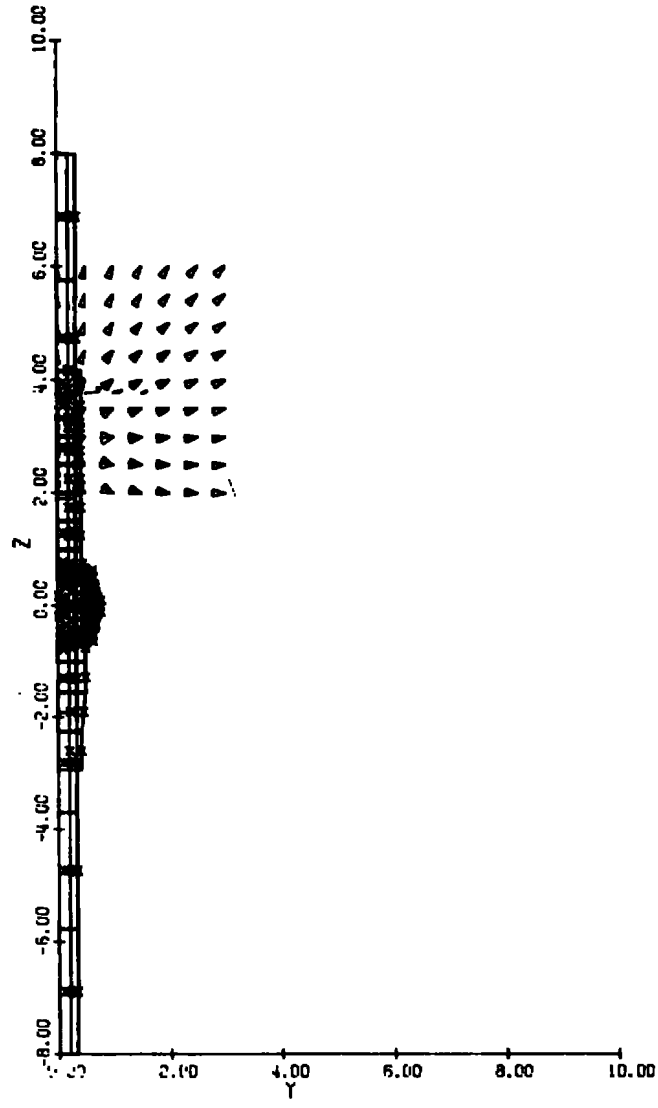


a. Side view

Figure B-3. Flow streamlines and velocity vectors.



b. Top view
Figure B-3. Continued.



c. Front view

Figure B-3. Concluded.

NOMENCLATURE

$\hat{b}_i$	Unit normal vector at i th control point
M	Mach number
M_∞	Free-stream Mach number
N	Number of singularities
$\vec{r}$	Position vector
u	x-component of velocity
$\vec{u}_j$	Velocity induced by j^{th} singularity when its strength is 1
$\vec{u}_{ij}$	Velocity at i^{th} control point, induced by j^{th} singularity when its strength is 1
v	y-component of velocity
$\vec{v}$	Velocity
$\vec{v}_i$	Velocity at the i^{th} control point
$\vec{v}_\infty$	Free-stream velocity
w	z-component of velocity
x, y, z	Cartesian coordinates
β	Stretching factor for Goethert's Rule, $\sqrt{1 - M_\infty^2}$
γ_j	Strength of j^{th} singularity